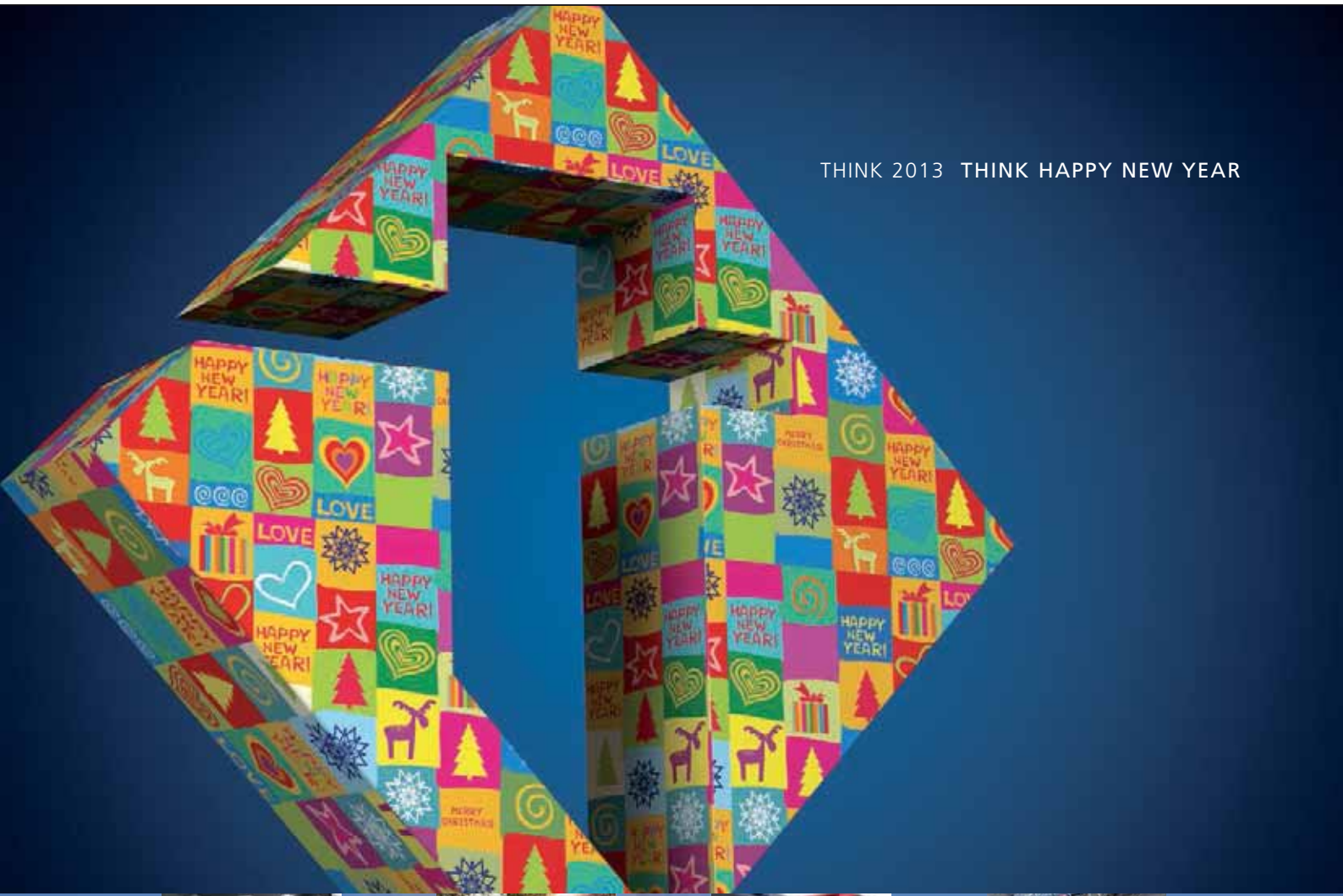
decomagazine

THINK PARTS **THINK TORNOS**

63 04/12 ENGLISH



THINK 2013 **THINK HAPPY NEW YEAR**

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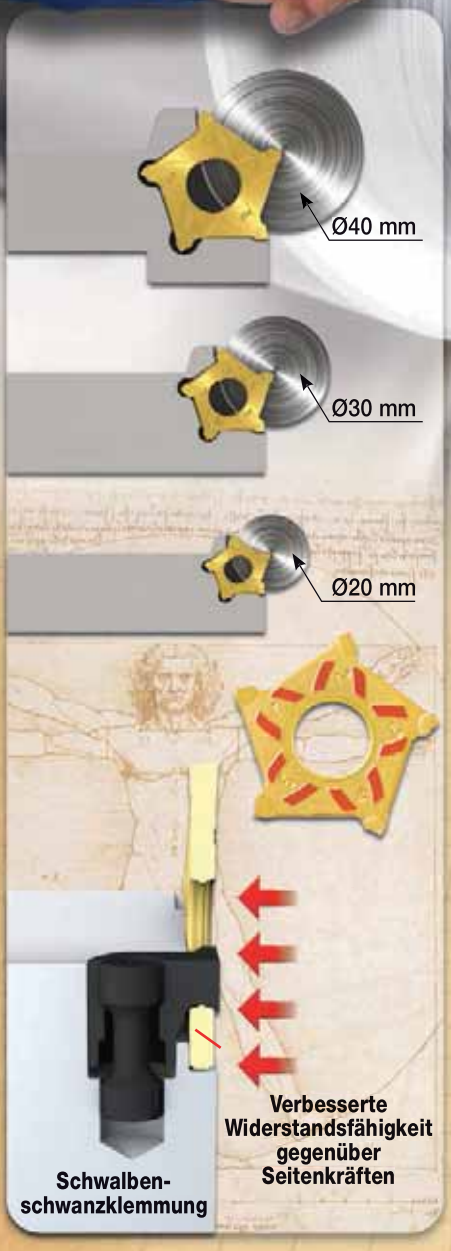
SUMMARY

PENTA IQ GRIP

NEU

MAX BEARBEITUNGSTIEFE 20 mm



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IQ HIGH LINE

INNOVATION THROUGH NEW PRODUCTS IS AT THE HEART OF TORNOS' STRATEGY

Dear Reader,

In the coming years, Tornos will tackle the challenges of the globalized machine tool industry with a realigned business strategy. In a turbulent world where economic cycles get shorter and the repercussions are far-reaching, it is important to continue to focus on essential topics, with the customer at the core.

Internationalization of the business is key. Deeply rooted in Switzerland for more than a hundred years and known across the world for Tornos' trademark Swiss-type lathes, we have succeeded in building up a very strong position in Europe as the turning industry market leader. More than forty years ago, Tornos started supplying customers in Asia with high quality machines built in Switzerland. Since then, many emerging markets have rapidly become developed ones, requiring Tornos to adopt adequate structures in these markets. This starts with a broad sales and agent/distributor network. But for Tornos, strong application support and good quality service structures close to our customers are of equal importance.

Furthermore, both customer training and coaching will play an even more important role and Tornos will build up these capabilities in different locations across the world, near to our customers.

Innovation through new products is at the heart of Tornos' strategy. Competitive products, dedicated to your needs as our customer; this is what we are aiming for. SwissNano is our latest brand new product, specifically developed to meet the demanding requirements in micromechanics, i.e. for small, high precision parts. However, we are also innovating through an evolutionary approach, by adding new functions to existing products. This includes such elements as the B-axis for the EvoDeco 16, specific milling attachments, and other special developments for a variety of different machine models. Tornos will continue to introduce new products and get even closer to customers, but the focus remains the same: to provide our customers with real solutions to produce parts as efficiently as possible, and preferably finishing them entirely on one machine.

Sincerely yours,

W. Nef
Head of Sales

SWISS LINE

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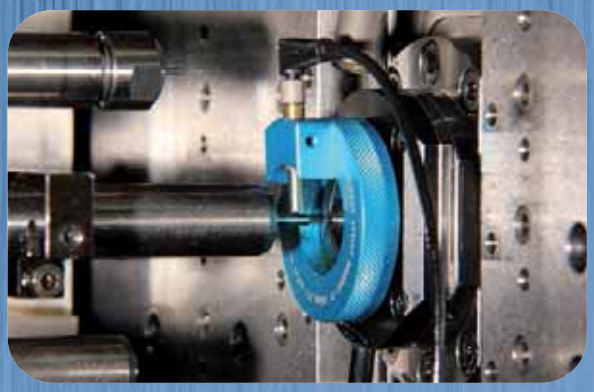

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PROVIDING BETTER SERVICES FOR CUSTOMERS: ADAPTING THE ORGANISATIONAL STRUCTURE

The strategic orientation for the next five years unveiled by Tornos in October comprises the following six elements: greater internationalisation of its activities, consolidation of flexibility, growth through innovation, more developed service activities, increased operational excellence and the provision of specific solutions for target market segments. What are the consequences of this for customers? To answer this question, we met with Carlos Cancer, director of the new Market & Sales Support entity which aims to offer customers added value.

In Moutier, the new department is buzzing with activity, with the specialists for the various markets and product lines working side by side in the large open space designed to promote communication and problem solving. Mr. Cancer explains: *"Markets are developing and our customers need solutions which are even more finely tailored to their needs, and they need them much quicker. Therefore, we decided to bring together the managers for the product lines for single-spindle (Mono) and multi-spindle (Multi) machines, milling and customer service, housing everyone dealing with customer service (apart from sales) in a single department to maximise their efficiency".*

Developing markets

While Europe has seen the complexity of the produced parts increase, the production of a large number of other parts has been outsourced to growth countries such as the BRIC countries. To address these changes, Tornos has developed product ranges which provide specific solutions for each type of need. Mr. Cancer explains: *"Customer demands have changed, broadly speaking, and while innovation is one of the pillars of our growth, we must ensure that we innovate quickly yet properly. Tornos has always been an innovator and our new organisation aims to reinforce this aspect".* In 2013, the company will

unveil several new products which will illustrate this desire to surprise the market with innovative solutions (see the inset relating to the Swiss Nano).

Defining needs

"Our objective is to gain better understanding of the needs of customers and markets. We are lucky enough to be one of the only manufacturers to offer single-spindle turning machines, multi-spindle machines and milling, so we are able to compile a large amount of information from different sectors of activity. By pooling the experiences of all of these, we will be able to better identify the expectations of our customers and therefore provide them with solutions which are perfectly adapted to their needs" explains the director.

Solutions for…

The solutions put forward by Tornos depend on a broad range of products designed for different levels of complexity and requirements. But the manufacturer's vision does not stop there; using the markets targeted as a basis, the engineers work continuously to develop new units and devices which are designed to keep improving the productivity of installations. Mr. Cancer tells us: *"When defining solutions, the synergy between the various domains is of key importance. For example, we recently implemented single-spindle watch industry machine processes on multi-spindle machines and multi-spindle automotive processes on single-spindle machines".*

… better value for customers

"What we aim to do is add value to our customers' machining processes" states Mr. Cancer, adding: *"This may be through new products or new options, but also through specific services such as coaching or targeted training".*

Better sales support

Former sales manager turned subsidiary director, Mr. Cancer knows that the quality of the relationship with customers depends on well-informed, well-trained contact staff. He explains: *"The goal of our new organisation is also to help our sales forces to better determine the needs of our customers and respond to them ever more quickly. To do this, we are going to simplify our processes and offer them tools, plus the additional product and service knowledge".*

In concrete terms, what is going to change?

Mr. Cancer adds: *"Our task does not end with providing more efficient tools. We must also continue to improve the quality of our service. Our customers must be able to rely on us to ensure they get the best use from their production equipment".*

Mr. Cancer concludes: *"Customers want results from their Tornos machines. We are here to help them improve these results".*

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SWISS NANO – THE WATCH SPECIALIST

In 2013, Tornos will unveil a watchmaking machine which features a radical new concept. This Swiss Made machine will incorporate more than 50 years of expertise in watch production. Swiss Nano will boast an innovative new design (see image), with the smallest footprint in its category.

We will cover this new machine in more detail in our next issue.

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TWO NEW MACHINING CENTRES WITH 3 TO 5 SIMULTANEOUS AXES

The recent AMB and BIMU trade shows saw Tornos unveil its new high-precision vertical Almac CU 2007 machining centre. This machining centre has longer strokes than its smaller cousin, the CU 1007. Tornos is aiming to expand its activity on a global scale in the milling sector, and to meet demands in other industries, including microtechnology, while preserving the high precision and expertise for which Almac centres have become renowned throughout the watchmaking sector.

Two new machines have been developed as part of this strategy: the Almac CU 2007 with its 500 mm X stroke and the Almac CU 3007 with a 700 mm X stroke, which will be available in early 2013. The new range represents a dual development: the ability to machine both the toughest materials and workpieces up to 10 times larger than the CU 1007 can handle. The new Almac CU 2007 and Almac CU 3007 machining centres are high-performance machines capable of machining up to 5 simultaneous axes with high-precision repeatability. This is thanks in large part to its design, and to its basic mechanical components developed using the very latest technology.

Tool magazine: renowned design, high precision, speed, high capacity

To enable major machining operations, the two Tornos machines are equipped with HSK 40E cones, which are renowned for their rigidity and performance. The machine can store tools of up to 80 mm in diameter and 200 mm in length. The machines are equipped as standard with a 24-position tool changer which can be optionally increased to 40 positions. The tool changing system has been developed to offer sufficient machining capacity for complex workpieces in 5 simultaneous axes, *"This technical choice was based on reliability and performance; it had to allow us to perform quick changes while guaranteeing a high level of precision and rigidity",* explains Lucien Cassotti, product manager and head of R&D for Almac products.

Spindle: quiet, efficient, rigid, powerful, accurate

With extremely short chip to chip times, Almac machines are way ahead of even their most efficient competitors, and that includes the spindle. Capable of even the most demanding machining operations, it offers torque of 11.8 Nm, short acceleration and a speed of 20,000 rpm. This high-end spindle offers the possibility of centralised cooling.

Optimal swarf management

In order to enhance the machine autonomy, the Almac CU 2007 and CU 3007 have been designed to guarantee an optimal chip flow. *"This may seem like a trivial matter but it's essential for our customers - it's why we paid such close attention to it when designing the machines. And a chip conveyor can also be added to the machine equipment to guarantee maximum machine autonomy",* continues Mr. Cassotti.

In summary, the Almac CU 2007 and Almac CU 3007 are characterised by their excellent mechanical efficiency and high-performance components designed to guarantee optimal results with a fixed table. It only remained to add a rotary table.

5 axes: a partnership to guarantee excellence

The Almac CU 2007 and the Almac CU 3007 are now available with optional 4th/5th axes for machining in up to 5 simultaneous axes. The standard equipment, with its latest generation Fanuc type 31i-B5 numerical control, enables adaptation of the wide range of rotary tables already on the market. The specialists at Tornos work closely alongside customers to precisely identify their needs based on their environment and the workpiece in question. The aim is to offer customers a genuine turnkey solution.

"Unlike our many competitors, we don't have predefined 5-axis solutions; we create them with and on behalf of our customers. We guide them every step of the way; that's how we've managed to stay successful", explains Mr. Cassotti. *"The Almac CU 2007 and the Almac CU 3007 are designed for larger workpieces, such as you might find in the automotive sector, for example. Tornos' Almac machining centres have been successfully serving some of the most demanding watch companies for many years, and we have developed a strong spirit of partnership with them. We now want to export the concept to other markets"*, concludes Patrick Hirschi, commercial manager.

A robot to handle the extras…

The machines can also be equipped with a 6-axis robot to load workpieces into the machining area, among other things. Some years ago, Tornos developed a robotic loading and unloading cell. This modular cell allows numerous functions to be added, transforming the machining centre into an integrated production cell. *"For example, we can palletise workpieces and clean them using either an air nozzle or an ultrasonic bath system. We can also deburr or sort workpieces using sensor systems… the robotic cell opens up a whole range of brand new solutions.*

These solutions also allow the machine to operate for many hours without human intervention", concludes Mr. Cassotti in front of the installation.

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Führungsbüchsen
Guide bushes

Type / Typ CNC

- Canon non tournant, à galets en métal dur
- Evite le grippage axial
- *Nicht drehende Führungsbüchse, mit Hartmetallrollen*
- *Vermeidet das axiale Festsitzen*
- Non revolving bush, with carbide rollers
- Avoids any axial seizing-up

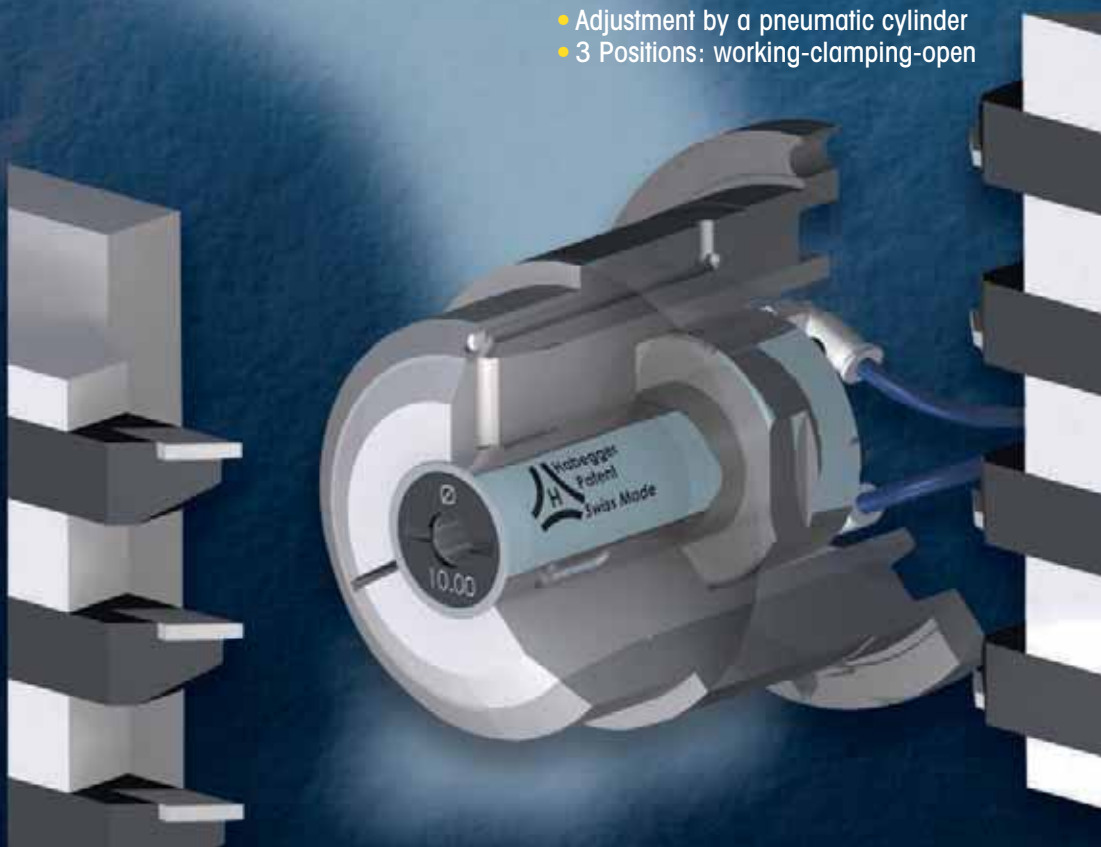
Type / Typ C

- 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

1 Porte-canon: 3 types de canon Habegger!
1 Büchsenhalter: 3 Habegger Büchsentypen!
1 Bushholder: 3 Habegger guide bush types!



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WITH A HYDRAULIC GEARSHIFT SYSTEM FOR BIKES, THE RENNINGEN-BASED SPECIALIST ACROS SETS NEW STANDARDS

SUCCESS WITH INNOVATIVE TECHNOLOGY AND PRECISION

HWG Horst Weidner GmbH is known as a specialist in special bearings, ceramic bearings and hybrid bearings, which are used especially in motorsport, aerospace as well as under extreme corrosion conditions in the food industry. Until now, only insiders have know that the company has produced high quality mountain bike components for its subsidiary Acros. To optimise its production process, a Tornos Gamma 20 was purchased at the beginning of the year, which has been able to brilliantly prove itself in practice right away.

HWG was originally established in 1982 as a company specialised in bearings and components and expanded shortly thereafter to add the customer-specific bearings and components it produced to its sales program. Today, the company has become a technical leader that supplies customers world-wide with bearings, miniature ball bearings, thin section bearings and special ball bearings. Based on the precision machines that are available for production, HWG also offers the corresponding system solutions as well as shafts and housings. During the mid 90's, the sports enthusiast junior manager Frank Weidner came up with the idea of applying their core competence in bearings to bicycles. As a result, Acros Sport GmbH was established in 1999, which has achieved cult-status since then. The Acros Team is formed by

young, dynamic and fully motivated employees who are living their dream. They are all active mountain bikers and see their trails as a source of new ideas and as a foundation for their work. Acros has the goal, and constantly challenges itself to make mountain biking better. The high vertical integration and the available HWG precision machines make quick, innovative and high-quality implementation of ideas possible. The products are developed using modern 3D-CAD programs and are subjected to extensive FEM analyses. The first prototypes are then subjected to continuous load cycles on its in-house developed test benches in order to test the assemblies thoroughly. Afterwards, pre-production models are used by Acros factory testers under the most unfavourable weather conditions in order to optimise the components and make them ready for series production.

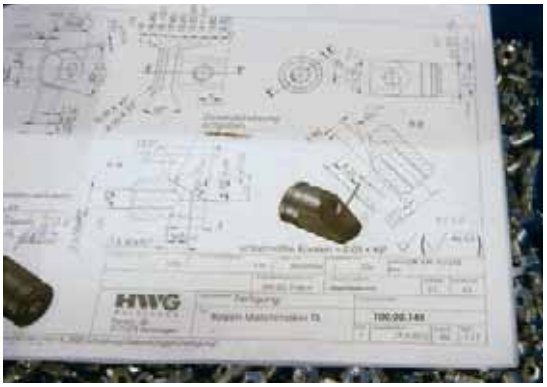
A revolutionary development is launched

Christoph Muthers had already built a hydraulic gearshift system in 2006 and tried to place it on the market. He was unable to achieve success until 2009, when Acros adopted the idea and hired him as a design engineer. Since then, it has been developed, produced and tested. From the outside there is virtually no difference to the previous gearshift, but

the devil is in the detail. In order to make the gearshifts suitable for series production, many parts had to be redesigned. In doing so, also the weight was further reduced. With a weight of 426 grammes for two gear levers, a front derailleur, a rear derailleur, pipe and oil, it weighs 150 to 200 grammes less than the gearshifts made by the two global market leaders. Thanks to the interchangeable indexing units, the system offered as "A-GE" can change gears eight, nine or even ten times. Very small steel ball bearings on all moving parts guarantee precise gear shifting that is as smooth as silk, with a system that makes it possible to change three gears all of a sudden, in both directions. Also due to the lack of cables, the gearshift requires much less maintenance than conventional gearshifts. These advantages were not obtained by chance, but are the result of an extensive production process. It is for this reason that Frank Weidner and his team have been searching a long time for a suitable CNC machine and found an optimal solution with the Tornos Gamma 20.

Thoroughly satisfied with the service

HWG has multiple CNC machines and knows almost all of the leading machine suppliers. However, the search for a machine suited to the required manufacturing task was not an easy one. On the one hand, the components of the hydraulic gearshift system are very delicate and complex. On the other hand, the material that is used is very difficult to machine. Plus, the system consists of multiple components that are produced in limited amounts in series production and for which absolute precision must be guaranteed. Based on his personal contact to the Tornos regional sales director, Werner Hoffmann, a Tornos Gamma 20 came under discussion. It is the first Swiss-type concept machine used by HWG and was therefore viewed very critically at the beginning. However, due to the commitment and skill of Tornos employees in Pforzheim, this caution gave way quickly to enthusiasm. Jointly, they carried out time studies, created programs and selected and purchased suitable tools. Frank Weidner explicitly praised the service prior to commissioning: *"Tornos is the only machine manufacturer who does not supply the customer with a full KW connected load, but explicitly specifies the necessary cable cross section".* As a result, Acros employees were able to



prepare themselves properly for the new machine and were also appropriately trained. This year in April everything was ready and the new machine was delivered. Everything went very smoothly, and even the exotic oscillating holders were delivered on time. Acros was able to start production immediately and three months later has very positive results. Precision, availability, easy setup, everything works perfectly. The hydraulic gearshift system consists of approx. 250 single parts, most of which are produced on Gamma 20. When this gearshift has its expected breakthrough on the market, you can be certain that after these experiences at Acros many additional Gammas will be required.

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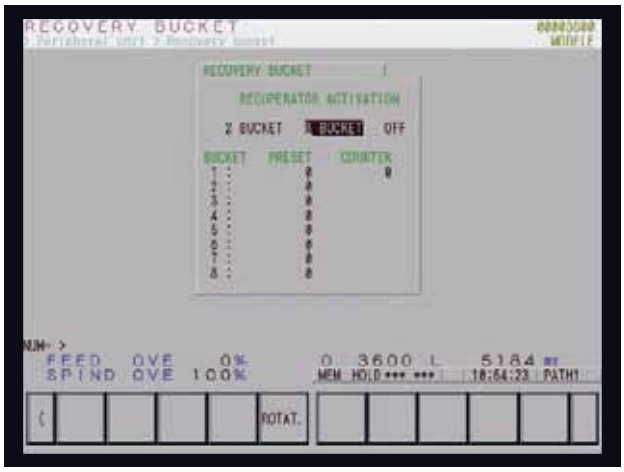

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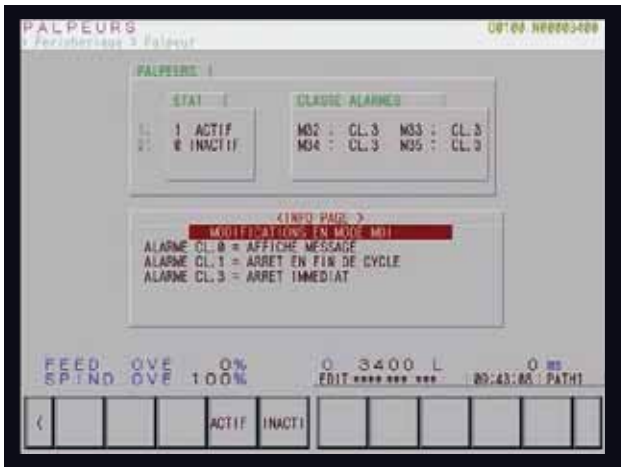

②

Numerical control systems are not particularly ergonomic as a rule, and can be complex to operate. When Fanuc decided to stop producing the 16iTB control system used on Tornos machines, we had to act quickly to ensure we could continue to offer customers the best service. "*We wanted to do more than just change the numerical control, so we decided to improve the user's experience with the new control system",* explains Marco Dolci, Motion Control manager at Tornos. He adds: *"The Fanuc environment doesn't give us much freedom, so we focused on simplifying the functions using information-based menus and pages. So rather than inputting chains of data, you just select the right information on a menu page, which makes the machine much easier to use".*

He concludes: *"Since the roll-out, we have received a lot of comments and suggestions from customers, which are handled by our team. In the version below no fewer than 12 customer requests have been added. Your opinion matters to us. Please send any suggestions to software@tornos.com".*

MOTION CONTROL 0209.00

New features of the version

- Integration of configurable OEE systems
- Integration of 2-8 bucket vacuum system management with new macro page [image 1]
- Integration of the macro page with sensor activation/deactivation option [image 2]
- SBF feeder torque modifiable from workpiece program (G909 P4)
- Addition of mechanical locking/unlocking functions for spindles S11-S41 on Deco20/26 PTO

B AXIS FOR GREATER PRODUCTIVITY

At the start of 2010 Tornos launched the EvoDeco 16 machine. This turning machine, designed to replace the famous Deco 13a, with its four independent tool systems, has slotted seamlessly into the technical parts market. In early 2013, the manufacturer will deliver the first of these machines equipped with a B axis. To find out more, we met with Philippe Charles, product manager for Tornos.

"We have a lot of EvoDeco machines installed with customers operating in the dental sector, and they asked us to integrate a B axis for secondary operation positioning, to make their setup and machining operations much more flexible. We've developed it, and now we're unveiling it!", explains Philippe Charles. Perfectly integrated into the secondary operation process, this tool system, equipped with 3 powered machining positions, is available ex works and can also be fitted with an end-mounted drill.

Reduced setup time

The new B axis provides companies with the perfect response to two major problems encountered on the market. Firstly, with series becoming ever shorter, users want to cut their setup and setting time. Philippe Charles tells us: *"We presented this new option to customers operating in the dental, medical and jewellery sectors, and all expressed a keen interest in the solution's capacity to increase the efficiency of their production".*

Increasing machine capability

The second important factor is the possibility of producing increasingly complex parts. The product manager explains: *"The range of parts that can be produced simply using the TB-Deco has again increased"*. And despite the Moutier-based company having recently positioned itself on markets with lower added value with its Delta and Gamma ranges, it remains the leader in the production of technical parts with high added value. The B axis is another jewel in its crown.

TECHNICAL SPECIFICATIONS

Number of rotating tools:	3
Max. spindle speed:	0-8,000 rpm
Power 100%/40%:	1.5/2.2 kW
Torque:	4.77/7 Nm
Collet:	ER 11/ESX 12
Max. clamping capacity:	7 mm
Adjustment possibility:	0-90 degrees
B axis resolution:	0.001 degrees

A PARTNERSHIP FOR MACHINING WITHOUT COMPROMISE

When it unveiled the Sigma range, Tornos knew that this machine would be a benchmark in the bar turning world in terms of performance and rigidity.

To ensure it would be a reliable partner, and adaptable to any type of customer, Tornos expressed the desire to offer, from the outset, a vast choice of tooling systems. One of the most high performance of these is the Coromant Capto. It is therefore no surprise that a user as demanding as DC Swiss would turn to Sandvik Coromant and Tornos to find a solution for its HSS thread tap blanks.

High-end thread tap tools

"DC Swiss designs, produces and sells high-end thread tap tools for companies working with all types of materials. We are the Swiss market leaders and hold a privileged position on the global market. Currently, more than 70% of our turnover comes from exports, particularly to the European Union" explained Yan Kaser, production manager at DC Swiss. To remain competitive within this market, the company must be able to react quickly to every request and have tools available at all times. To do this, it is stepping up its efforts with modern, dynamic and profitable production. Mr. Kaser added: *"It is this philosophy which led us to purchase Sigma 20 machines, as their flexibility and performance allow us to respond very efficiently to our customers' needs"*. DC Swiss is continuously developing products to meet every requirement and technological development. The company offers a sales programme which is unique in its diversity. It includes diameters

from 0.3 mm to 200 mm. This broad capacity means it can meet a wide range of demands, from the watchmaking sector to heavy industry.

HSSE-PM powder metallurgy high-speed steel

Every day, DC Swiss machines a range of materials on Sigma 20 machines, which includes HSSE-PM high-speed steel and materials using powder metallurgy. This type of material is not standard for sliding headstock lathes, and is very difficult to machine. To meet this challenge, DC Swiss called on Sandvik Coromant and Tornos. *"Thanks to the rigidity of the Coromant Capto system and the structure of the Sigma machine, we are able to make passes of 3/10ths. Our machines are really worked hard - to the extent that we have to top up the oil every 6 months",* reveals Mr. Kaser. The Sigmas are used to machine thread tap blanks from 3 mm to 16.5 mm. The high clamping forces and the spindle outputs, which are identical in both main and secondary operations, play a major role in the performance of the machine. The manager finishes by saying: *"The modularity and the quick changeover offered by the Coromant Capto system have really simplified our work. Thanks to the Coromant Capto tool holder, we can change tools very quickly on these machines. The modularity and the extreme flexibility of the Sigma machines allows us to use the same tooling in both main and secondary operations. The rigidity of the machine is also identical in both main and secondary operations, which allows us to distribute main and secondary operations efficiently."*

Around 5000 standard products

The Coromant Capto system was introduced in 1990. Its interface is characterised by a 1:20 cone-shaped planar surface and, most importantly, by a polygonal section. As a component of the machine, the polygon actually provides the best possible torque transmission properties. This shape adapts perfectly to the machine cone and gives unbeatable results in terms of precision and stability. The universality of the Coromant Capto system has ensured its widespread use over recent years. The logically configured and structured programme of tools gives access to approximately 5000 standard products which cover practically all turning, milling, turning-milling, drilling and boring requirements.

A modular tooling system must be designed so that it can be adapted to the broadest range of trends and developments. This includes applications for which the Coromant Capto system must adapt to the specific needs of certain types of machines and processes. The famed Sandvik Coromant Capto tooling system allows tooling to be standardised for all applications, whether this be turning or rotating tools. Furthermore, it offers excellent repeatability and remarkable rigidity which improve the cutting conditions and the swarf rate.

Quick tool changeover

Tool changeovers are much faster with the Coromant Capto. It takes under a minute, compared to an average of around eight minutes with conventional systems on a CNC lathe. Ralf Gerber, one of Sandvik's specialists, explains: *"The cutting tool suppliers must have competencies at every level of the manufacturing processes in a modern production environment to be able to offer their customers support adapted to their individual needs. The technical-commercial specialists and the experts in machine investments and applications at Sandvik Coromant worked closely with the workshop teams at Tornos to select the most suitable tools and develop the best possible processes for each application".*

An overview of machining

In terms of the production of parts, the key to success is better integration of the various stages in the manufacturing process, whilst meeting the requirements of automated production: trouble-free machining, better productivity and reduction in machine downtime due to faults. The innovative approach developed by Sandvik Coromant covers all aspects of manufacture from the point of view of the tooling and the knowledge and services needed for the application. The Coromant Capto tool holding solution is central to this approach.

The tools play a key role in each of the critical stages of manufacture, from the initial design to delivery of the finished parts, including development of the process, the choice of tools and methods, preparation of the job and the tools and, lastly, the machining itself. Mr. Gerber concludes: *"The Coromant Capto system meets all modern machining needs, particularly in terms of increasing the cutting speed and the pressure of the coolant and ensuring the tools are optimally balanced, whilst facilitating more flexible management with cutting-edge tools and methods".*

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A RADICAL DEVELOPMENT…

Traditional systems use the material deformation principle to clamp or guide bars. Since the 40s, the collets and guide bushes have been slotted, with the material's flexibility ensuring the clamping force. Using an EvoDeco machine installed in France, we have discovered a new generation of collets and guide bushes which operate with high-precision jaws.

Interview in France with Patrice Armeni, director of Tornos France, and Alain Marchand, director of Swisscollet, a manufacturer of clamping and guiding systems in Geneva, to discover the reasons behind this new option and its advantages.

Responding to needs

"Guiding systems which use offset jaws have been developed to respond to very specific customer requirements", explained Patrice Armeni. He continued: *"In fact, one problem our customers regularly encounter is with the quality of the material. They have to work with either irregular or rectified materials, which means restrictions and significant costs".* The guide bushes and collets supplied by ECS eliminate both of these issues.

How does it work?

The high-alloy steel body of the collets and guide bushes is a monoblock structure with no slots, which means there is no way for swarf to enter the body. Offset jaws set to 3 microns move parallel to the axis to clamp the bar. This ensures that the bar is clamped along its full length. The compression springs fitted on the guide bush's clamping ring limit the axial movement and allow self-adjustment. The jaws have are PVD-coated to make them 2.5 to 3 times harder than hard metal.

Easy installation

These collets replace standard collets. The nut and guide bush must be replaced, however this is also an easy operation. Replacement is very quick. Because the clamping and guiding systems absorb major differences, users do not need to carry out a replacement every time the material is changed. A customer who needed a large stock of guide bushes with dimensions of 5/100 by 5/100 can use just one to cover a range of 6/10, for example - that's equivalent to at least 11 guide bushes! Because the jaws are also interchangeable, users can change the capacities of their guide bushes themselves. This also enables them to replace jaws that are worn.

Great flexibility

Mr. Marchand explained: *"Today, the major obstacle to the acquisition of this technology is experience. We need to change 70-year-old habits".* But why change? Mainly for reasons of flexibility, simplicity and economy. If users can work with a system that allows them to absorb the differences in bar diameters, they no longer need to rectify them. Mr. Armeni told us: *"Customers who work with this system don't want to go back. For example, one of them is working with raw strain hardening material which fluctuates by 4/10 of a millimetre, and another with PEEK, where there are no worries over material irregularities".* Mr. Marchand added: *"These new guide bushes can operate using bars with differences of 7/10 of a millimetre".*

3-position guide bush

The long travel offered by the clamping system also allows one of these new guide bushes to be used as a 3-position guide bush, without the need to change the entire rotating unit. The positions are guaranteed by the machine's M codes and the movements are controlled by the nut and compression springs. The offset jaws also allow the creation of ultra-precise clamping systems. For example, if the jaw is only required to close by one hundredth, it will be machined to ensure it is physically limited to this measurement.

Wide clamping and guiding range

The guide bushes are available to cover all the dimensions used in bar turning. The new design is available for standard F collets, double-taper collets (with eight jaws rather than four), large-aperture collets and multispindle collets.

Mr. Marchand explained: *"We initially developed this concept for large-aperture collets. One of our customers wanted to finish workpieces on the machine but he had to clamp behind a shoulder. He wanted to carry out quite long turning operations. We proposed a clamping process using a large-aperture collet and several turning operations to ensure machining is always as close to the clamp as possible, thereby preventing buckling."* The machine's clamping travel is increased by 60% in this case.

Transforming an EvoDeco turning machine into a machining centre?

During our visit we took the opportunity to discuss Tornos' customer-based approach. Mr. Armeni explained: *"Our range of machines allows us to address all requirements, from production of the simplest to the most complex parts. In terms of the latter, we often need to develop customised solutions. We have a multitude of options and devices at our disposal; in addition, we can rely on partners to develop complementary systems".* To this end, Swisscollet has recently developed a secondary operation clamping system which works like a small, made-to-measure vice. The result: The pen clip, produced in its entirety on Tornos machines by the "Let's combine our skills" pool, can be machined in 4 minutes on an EvoDeco (compared to 15 minutes on a traditional machining centre).

Working for customers

"Our customers rely on us to provide a faultless service, and this is even more important when it comes to high tech parts. We are constantly looking for ways to help them find the best global machining solutions", concluded Mr. Armeni.

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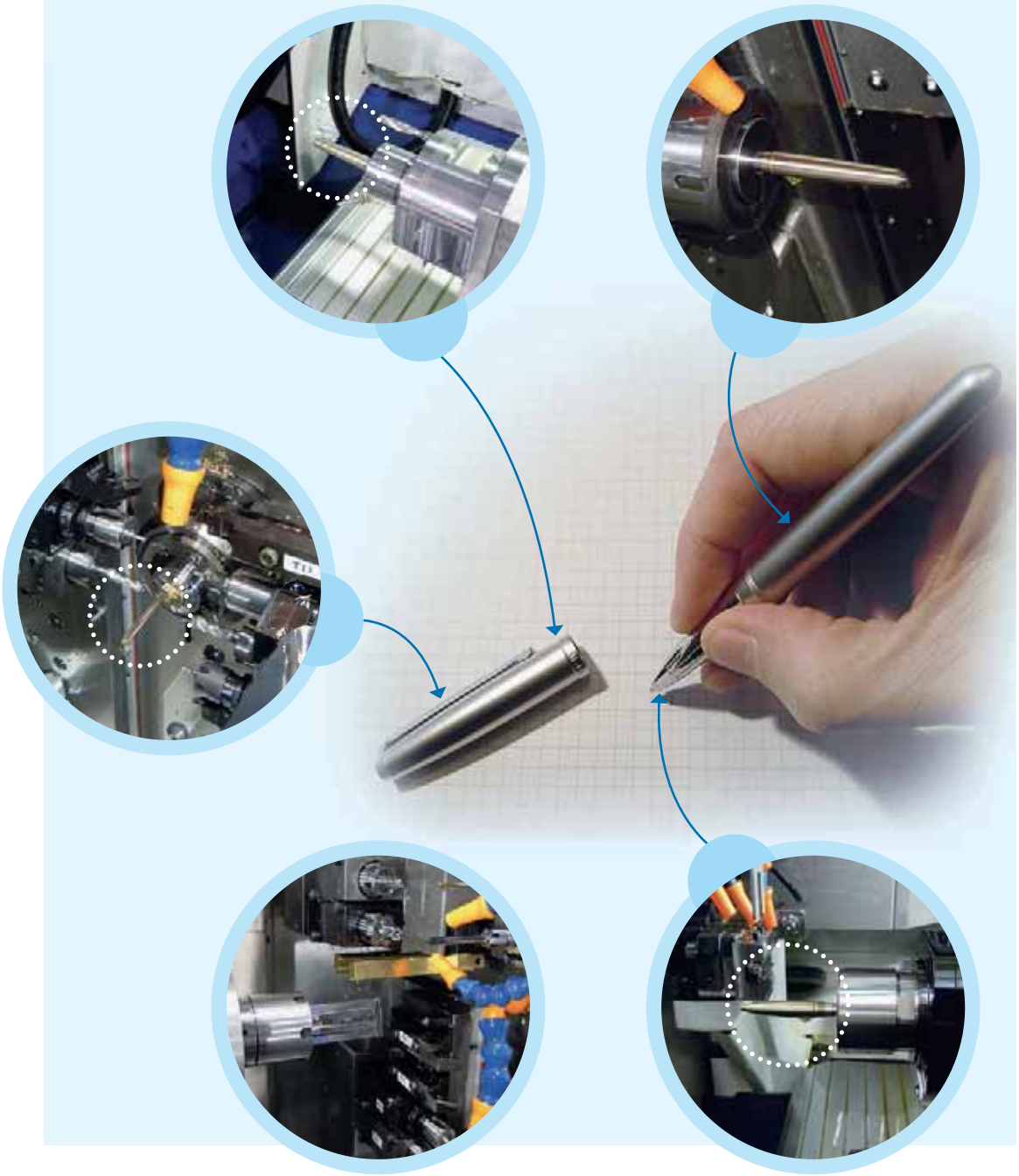
LET'S COMBINE OUR SKILLS

A Tornos machine is the heart of an efficient machining system, and around the world the company's specialists are working to help customers perform optimally. Individual skills are maximised by working together. In France, one project has brought together the following players: Wieland - semifinished and finished products in copper and copper alloy, Ham France - special tools in solid carbide/PCD and standard tools, Mobil – cutting fluids and lubricants, Precise – complete powered spindle systems, Tornos – single- and multispindle automatic turning machines and machining centres, Iemca – loading and unloading peripherals, Henri Petit-Jean – swarf processing, ECS – a specialist in clamping and guiding for hard metals. A high-end pen was the finished product.



TORNOS PUMPS PRODUCTIVITY INTO ALLSPEEDS

As a world leading manufacturer of sub-surface wire & rope cutting tools, sub-surface sucker rod pumps and lightweight hydraulic jacks for the military, aviation, rail, bridging, oil & gas, marine and demolition industries, Allspeeds Ltd has a component list of over 18,000 parts that are incorporated into its various product ranges and assemblies. With such a diverse range of parts, the Accrington based company has recently acquired a Tornos Delta 20 turning centre to eliminate bottlenecks with its production of small turned components.

Cycle time improvement from 90 seconds to 25 on the new Delta.

Cycle time reduction from 3.5 minutes to 45 seconds on the new Delta.

The innovative manufacturer that produces branded products such as Tangye, Webtool, Millingford, Kopp and Blake Hydram, operates a number of high specification machining and turning centres for the production of its high quality product ranges. However, the company's previous 2-axis turning centre dedicated to producing small turned parts was creating a backlog of up to 8 weeks on many product lines. The limited capabilities of the turning centre resulted in components requiring secondary milling and drilling operations on alternate machines.

To alleviate the problem, Allspeeds Engineering Director, Mr Keith Elliot reviewed the marketplace for a solution. As Mr Elliot comments: *"Prior to the arrival of the Tornos Delta in November 2011, the majority of parts required secondary operations and this meant we always had significant amounts of work-in-progress on the shop floor with parts moving from one machine to another. Scheduling our work was sometimes difficult as we couldn't run the optimum number of parts on the 2-axis lathe. This would mean tying up the machine for long periods, which would in turn delay subsequent parts. The arrival of the Tornos now enables us to run our optimum batch sizes whilst bringing parts in-house that were previously subcontracted out."*

When researching the marketplace for a suitable sliding head turning centre, Allspeeds reviewed the options available from all vendors. However, it was the capability versus cost argument that won it for the 40 employee company. As Mr Elliot continues: *"I reviewed all the available options and Tornos*

offered us exactly what we needed. Machine tools from alternate suppliers were loaded with options that we didn't require and this carried a hefty price tag. Whilst Tornos could also offer such options, the Delta proved to have excellent main and sub-spindle capabilities with more than enough power and the correct tool configurations to meet all our needs."

As a first time user of sliding head technology, Allspeeds is astounded by the benefits associated with the technology. First and foremost, the Tornos Delta has eliminated secondary operations on alternate machines by completing all small turned parts in one-hit. This has improved productivity by over 50% whilst freeing up machinist's time to a scale equivalent of saving one member of staff. This productivity saving can be noted on two parts in particular. One part has witnessed a cycle time reduction from 3.5 minutes to just 45 seconds per part. A second part that was previously turned in 30 seconds and then transferred to a secondary drilling operation that took an additional minute is now machined complete in 25 seconds. A saving of 90 seconds. Furthermore, the company no longer has to spend 30 minutes setting the drill for each batch run; an addition to the cycle time that is spread out across the batch run.

"We used to have one employee permanently on our 2-axis turning centre with secondary processes taking up capacity of our other machines. With the Tornos, this member of staff can operate our large turning centres and the Delta simultaneously," says Mr Elliot. This simultaneous operation is despite the unusually low batch numbers produced on the Tornos. Batches on the Delta can be as small as 5 to 20 and range up to runs of 500+ at Allspeeds. *"Despite sliding head lathes being renowned for large batch runs, our diverse product range means that we have to be extremely flexible. To this end, the Delta is relatively simple to program and set, additionally the guide bushless system allows us to use the machine as a fixed head lathe."*

The introduction of the Tornos Delta 20 5-axis turning centre has also delivered quality improvements for Allspeeds. By completing components in one-hit there is no geometric deviation or human error than can be caused by moving parts from one machine to the next. Additionally, the Tornos Delta can run at spindle speeds up to 10,000 rpm as opposed to the 4,000 rpm of the previous machine. Not only does this allow the Delta to improve surface finish and quality, but the Delta runs at high spindle speeds with no rattling and vibration from the barfeeding unit, which further enhances component quality.

Emphasising the productivity savings, the Tornos Delta is capable of completing what was previously one months' work in 10 days. The productivity of the Delta has surprised Allspeeds to such an extent that

the company is only running the machine for two days a week. As Mr Elliot concludes: *"The productivity of the Tornos has been a revelation. Not only has it removed any bottlenecks from the turned parts division, it has freed up staff, improved quality and component consistency. In the future, if our order book allows it, we may be looking at conducting subcontract orders to ensure the Tornos is running to its optimum. We are delighted with the machine and the respective service and support the company has provided us."*

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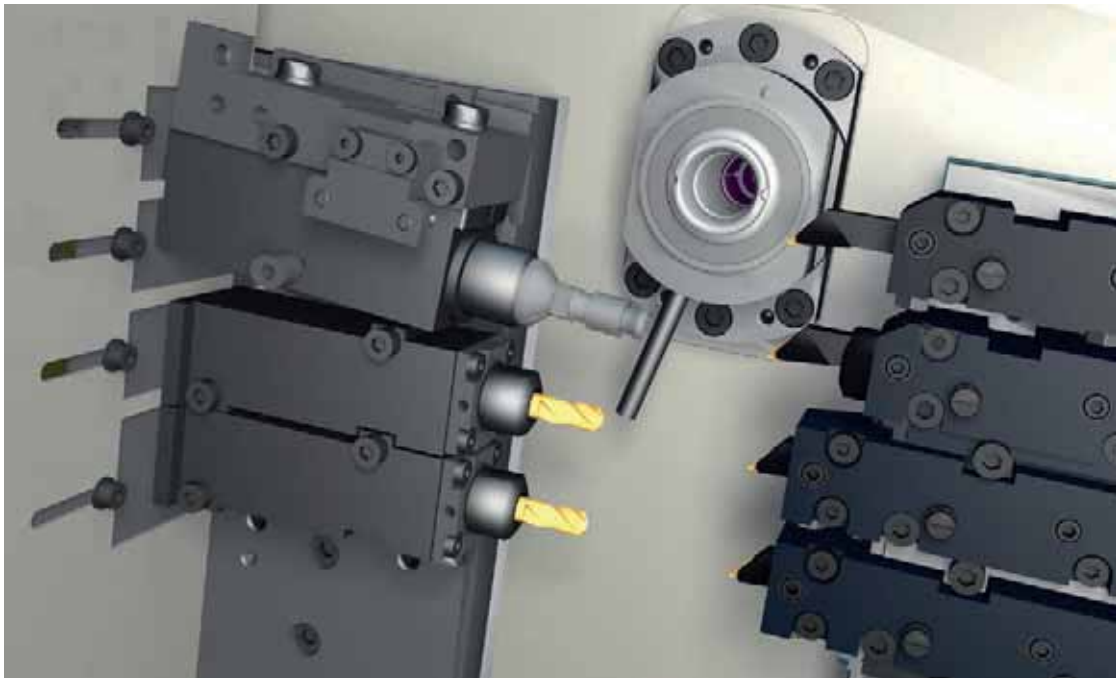
CUTTING ON THE EVODECO 10

EvoDeco 10 machines allow the integration of both main and counter hobbing operations. This process already has a successful track record on the market, notably in the watchmaking sector. This much-valued option allows users to finish their workpieces without second operations. The cost per workpiece is therefore significantly reduced, while the quality is noticeably better. The EvoDeco 10 machine can be used to perform hobbing counter-operations for front teeth only thanks to its Y4 axis. This means the teeth can be cut in concurrent operation time and corrections are now made numerically using the Y4 axis.

In addition to this hobbing function, the EvoDeco offers the option of mounting two hobbing devices on platten 2 of EvoDeco 10 machines at an angle in both directions.

The device is adjusted by adapting the support on the hobbing device, and an adjustment plate system is used to adjust the Y angle of the device. A hemispherical adjustment tab is used to adjust the Z angle. The system can also be fitted with a reference shim to assist the operator in making angular adjustments.

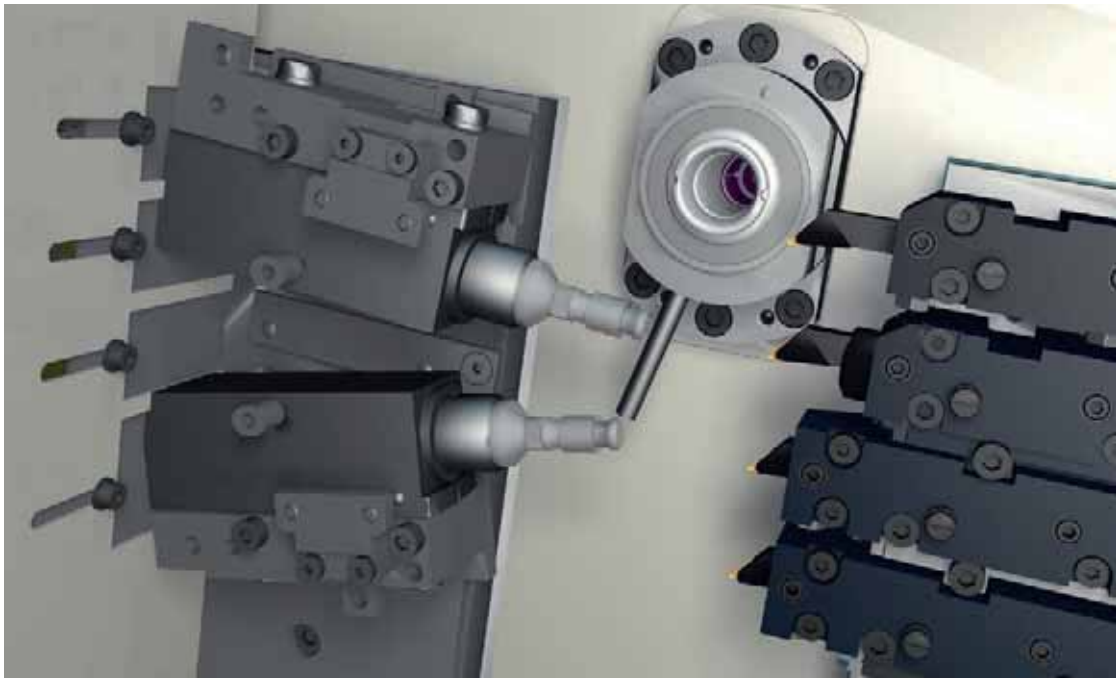


Two devices can be mounted on platten 2 of EvoDeco 10 machines.

When using a single hobbing device, two 1600-type transverse drills can be mounted to meet the work-piece requirements.

The option can be retrofitted on all EvoDeco 10 machines. It is still possible to perform gear hobbing counter-operations.

For more information, please contact Bertrand Faivre: faivre.b@tornos.com



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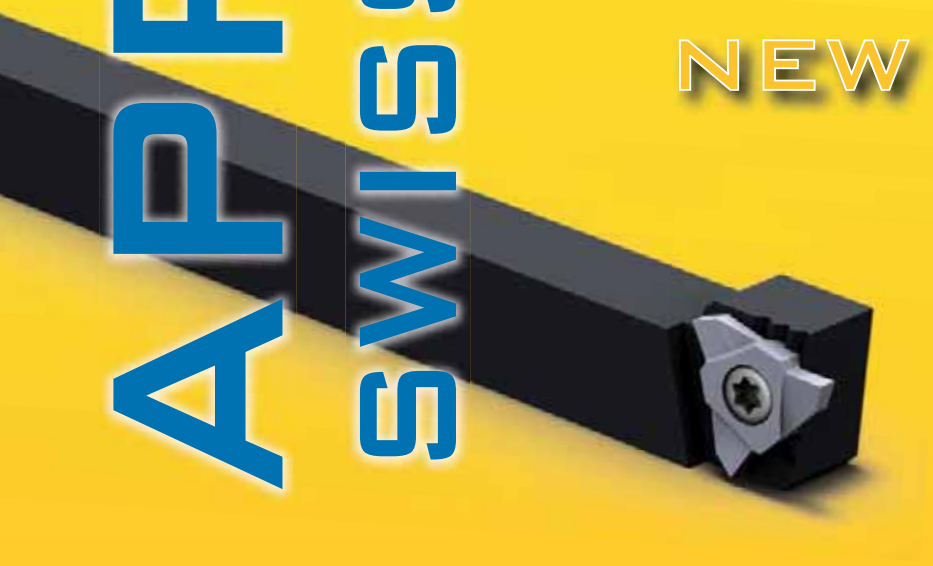

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BAR TURNING FOR WATCHMAKING AND OTHER SMALL HIGH-PRECISION PARTS USING MASTERCAM SWISS EXPERT

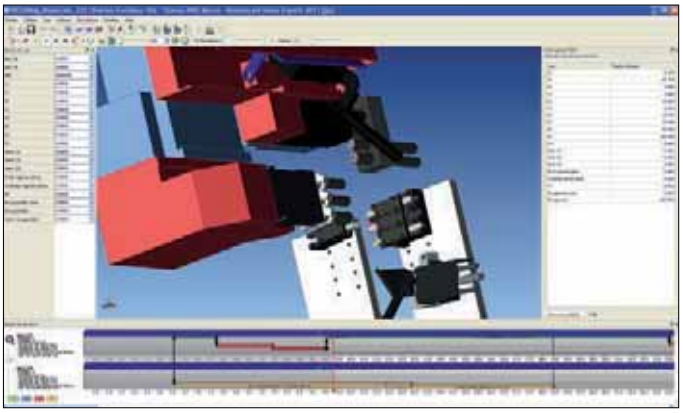
A mechanical engineer has standard CAM programs to use with his machines; the bar turner also needs software specific to his job. He also needs to be able to customise his work, whether in the dental, medical, connectivity, automotive or watchmaking industry, as described below. Machining operations, tools and "secrets" vary depending on the applications, and users must always be able to capitalise on their expertise.

Mastercam Swiss Expert for bar turners

Mastercam Swiss Expert has primarily been designed for the specific needs of bar turning. The software has been developed by CNC Software Inc. in the USA and CNC Software Europe SA in Porrentruy, Switzerland. The local dimension of the development ensures the benefits of professional expertise in technology specific to bar turning are maximised. This enables very close collaboration between machine manufacturers like Tornos, standard and special tool production centres and the CTDT (technical training centre) in Tramelan. The software is distributed by a number of companies chosen from among 450 retailers of Mastercam, the world leader in CAM. In western Switzerland, Jinfo SA offers Mastercam and Mastercam Swiss Expert based on user requirements, to guarantee maximum efficiency for each application type.

Automatic management of the exact CNC code words

With Mastercam Swiss Expert, the bar turner stands in front of his computer as he would his machine, enabling him to optimise the cycle times for workpieces ranging from the simplest to the most complex. The machine's complete kinematics are controlled with all types of tool. All specific operations, such as thread whirling, polygon turning, stamping, broaching, gear hobbing and flange milling are preconfigured. This working method allows programs to be generated automatically with no risk of errors, using the exact words and codes for TB-Deco or ISO. Users do not need to determine whether G02 or G03 machining is required, nor whether the values are positive or negative. This automation is possible because, when generating the code, the software takes into account the position of the tool on the plattens or turrets, as well as whether machining is taking place on the main or counter spindle.



Creation of the exact program on EvoDeco 10.

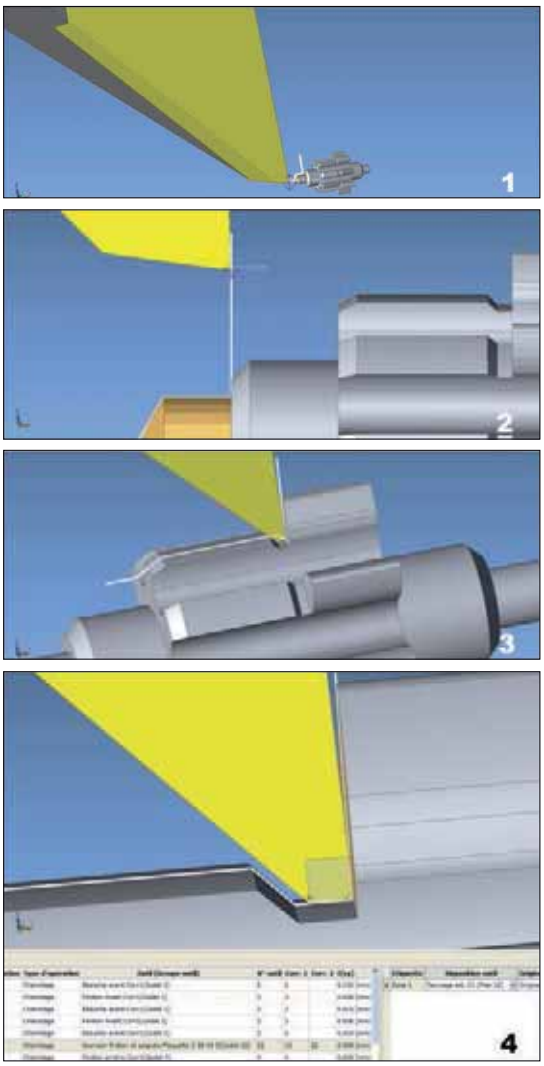
Fully configurable specific functions for watchmaking

Jinfo offers high-precision machining operations for watchmaking, incorporating its specialist machining methods, specific tools and production secrets. The examples from this article are used as aids for training on the Mastercam Swiss Expert.

Three days of personalised training are all that are required. Examples are given for each field of activity and each machine. Three customer workpiece programs are installed free of charge. This means the bar turner can benefit from concrete examples enabling quick, easy programming.

Machining a high-precision pinion

When machining a watch pinion, the bar turner faces a number of difficulties in addition to the mechanical rules. In this example, the pivot diameter is 0.2 mm for a length of less than 0.2 mm. The accuracy required for this diameter is just a few microns. In addition, as the wheel is to be fitted onto this pinion, it must be able to sit perfectly flat against the bearing surface. Several methods are used, and all are possible with Mastercam Swiss Expert.

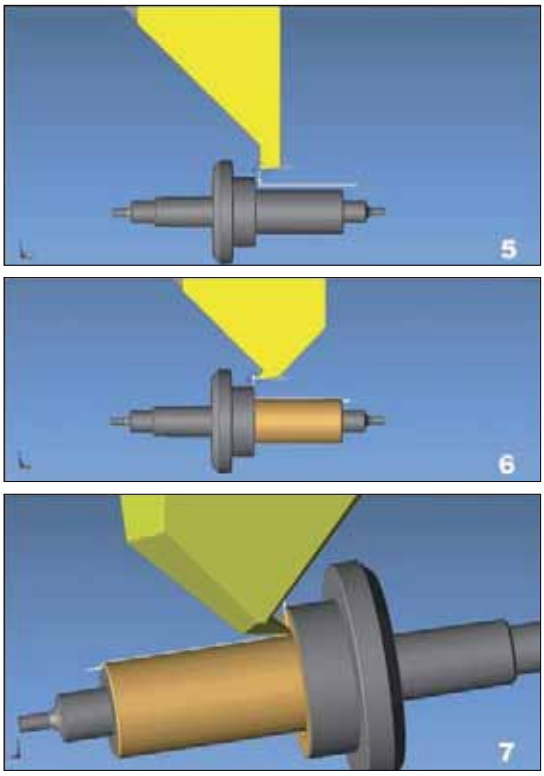


Pivoting and machining an undercut in a watch pinion.

The solution chosen by the customer in this case is to create an undercut to avoid problems in this location. The tools used for the operations described here are cutters with brazed plates from Wibemo SA which are ground to meet the specific requirements of each operation. The tools are shown with the correct dimensions to allow the movements and material removal to be precisely studied in the CAM program. Rough cutting (fig. 1) is carried out from the front of the workpiece towards the guide bush, leaving an additional thickness of 0.025 mm at X and Z. The finishing tool (fig 2) follows the path in reverse with the end of the insert having a 0.03 mm flat surface. In figure 3, the undercut is made using the tool geometry, by penetrating 0.025 mm inside the diameter. The machining operation shown in figure 4 uses the same tool but creates a small flat surface with a change of corrector tool. This method enables optimal control of the machining using both sides of the tool.

Rear of a pinion with an undercut

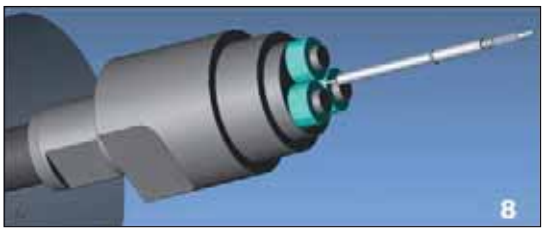
For the rear of the pinion, rough cutting and finishing are carried out in the same direction (fig. 5 and 6). The difficulty in machining the undercut is in ensuring that the tool geometry does not make bottom contact or collide with other diameters on the pinion. Figure 7 shows the operation in 3D (block by block display of the tool position), with precision a matter of hundredths.



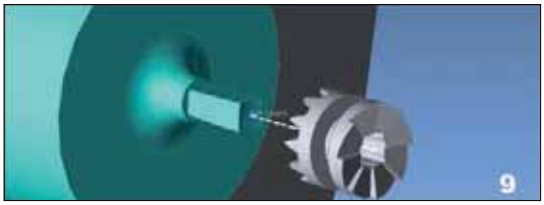
Machining an undercut.

Winding stem and broaching for a sliding pinion

Likewise, each specific operation, such as machining the winding stem or broaching a sliding pinion, can be fully controlled. In the examples shown in figures 8 and 9, the tools and all the parameters are recovered from template programs. In our examples, the tools used were the Harold Habegger SA S0.90 thread rolling die and the broaching tool holder with the PCM Willen SA punch.



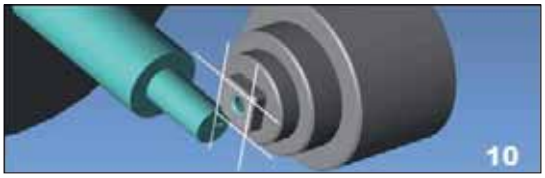
Thread rolling.

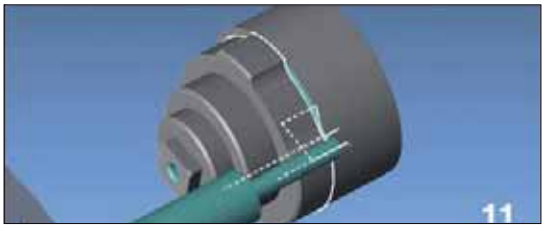


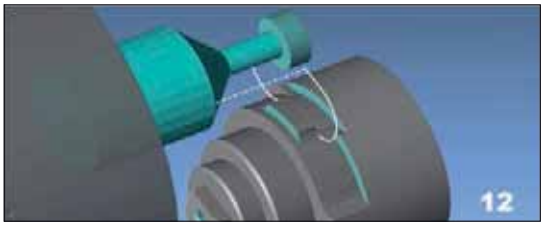
The broaching operation for machining a sliding pinion.

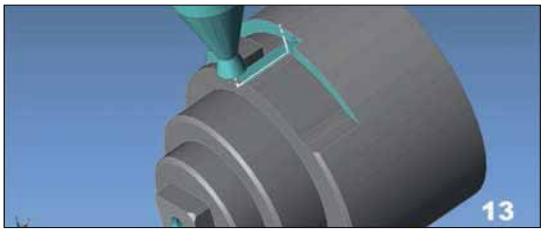
Milling a barrel arbor

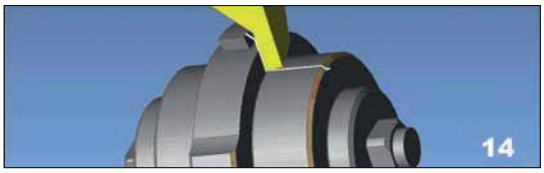
Machining a barrel arbor (figs. 10 to 14) requires very specific milling operations. Once again, there are several possible methods, one of which is shown below. The material removal is displayed for each operation based on the path calculated using the arbor geometry, the shape of the tool and the parameters selected by the bar turner. Any machining problems are displayed and the timing can be optimised by trying different variants.







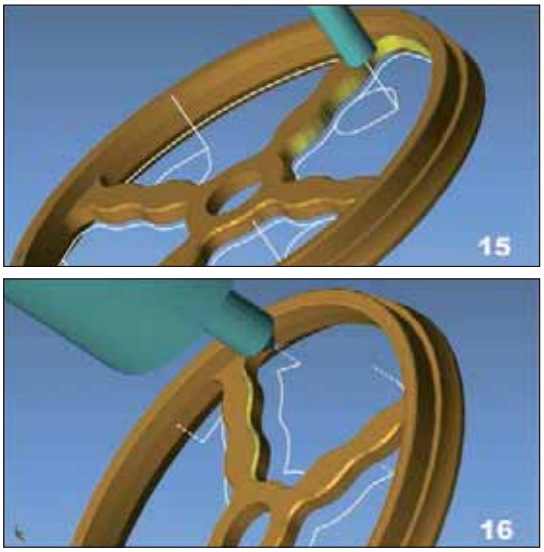




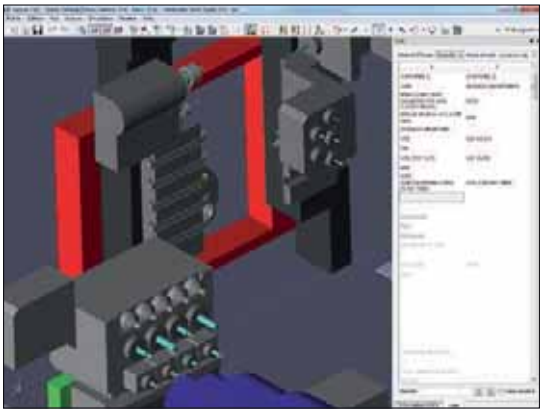
Specific machining operations for a barrel arbor.

Milling and bevelling a balance

In the above examples, Mastercam Swiss Expert CAM software can aid the bar turner in all precision adjustments involving turning, pivoting, undercutting and special tools. The same applies to milling operations, which are used more and more often in bar turning (figs. 15 and 16). Here, the program simply cannot be performed manually. The bar turner therefore has to somehow obtain the data for the geometries to be machined. CAD software may suffice, however its calculations do not take the preceding operations into account and offer no possibilities for optimisation or collision management. With this method, a G02 or G03 must be added manually, and sometimes the + or – sign must be changed. Mastercam Swiss Expert lets the bar turner choose: the type and in/out geometry, forward or reverse machining, the additional thickness between the rough cut and the finish, etc., while taking into account the material removal from the preceding operations. The user can also choose to work with tool radius compensation, by controlling the centre or edge of the tool. He can try out different variants, with the code generated in accordance with his selections.



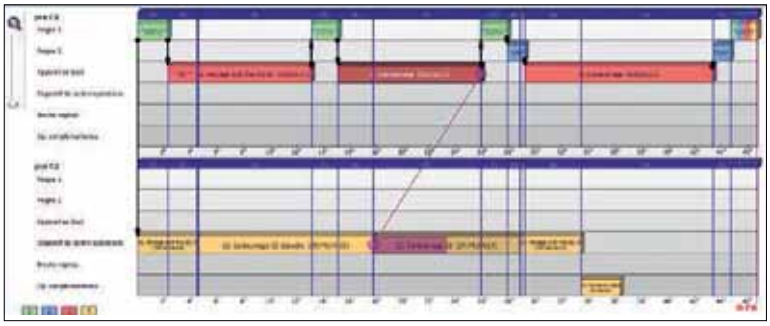
Simple operations to be carried out using Mastercam Swiss Expert.



Machining simulation on the Tornos Gamma 20/6.

Easy structuring of the multi-channel program

One of the major benefits of Mastercam Swiss Expert is its ability to create multi-channel programs. Using the Gantt chart, the operation sequence can be optimised via the graphic interface. Synchronisations and constraints are fully managed. Different variants can be studied and the cycle time is displayed. It is also a useful addition when formulating a tender.



Interactive optimisation of the operation sequence.

Complete kinematics of the bar turning machine

To save time during startup, Mastercam Swiss Expert features real simulation, including collision detection, which allows bar turners to explore the possibilities offered by a new bar turning machine.

This article describes the benefits of working with CAM software designed specifically for bar turning.

Acknowledgements

Jinfo would like to thank Wibemo SA in Rebeuvelier and the CTDT (technical training centre) in Tramelan for their contributions of technical information relating to high-precision watchmaking. They have been instrumental in helping to customise Mastercam Swiss Expert to these applications and producing this article.

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WORKING WITH MOTOREX FROM DEVELOPMENT THROUGH TO APPLICATION

Technical collaboration yields benefits for every end consumer. Countless Tornos machine tools bear testament to this, and are operated successfully throughout the world using Motorex machining fluids. A prime example of cross-process collaboration is the new MultiSwiss 6x14: Right from the development phase, the engineers at Tornos attach great importance to the "design factor" cutting oil. A peek into the 5000 m² Technology Centre in Moutier reveals how Tornos prepares the MultiSwiss for use by the customer.

The Swiss lubrication technology specialist Motorex applies its knowledge and skills to the field of machining fluids with the development of a new machine generation at Tornos. Thus with Motorex, top results are also guaranteed in the future for all applications.

In the Technology Centre in Moutier, several of the company's core operations are side-by-side an area covering five thousand square metres. First there is the modular production of all the machine types along with the final assembly stage, followed by further operations such as commissioning, set-up and testing of customer prototypes. Once the machine has run through the precisely specified process, it is packaged appropriately and sent off to the customer.

Coherent operational procedure

There are on average around 50 single-spindle and multi-spindle machines in the Technology Centre, which undergo a final assembly stage and are commissioned. All of the steps leading up to the dispatch of a machine are performed according to a precisely defined operating schedule, a kind of "script" which is tailored individually to each machine and to the customer's requirements.

In simplified form, every Tornos machine therefore runs through the following main steps:

Production of components and basic structure in after the order is received

Machine assembly

Final assembly and commissioning of peripheral equipment

Commissioning of entire machine

Running-in of machine according to checklist

Manufacture of various test parts and/or customer parts

Disassembling and preserving for transportation

Packaging and transporting the machine

Assembly and commissioning at the customer's site

Here, the multi-spindle block is "married" to the cast iron chassis during assembly. Generally speaking, the manufacture of a Tornos MultiSwiss is a mechanical and electrical tour de force.

100% compatible and 100% proven

Every machine is filled with the machining fluid for commissioning and then emptied once more prior to delivery. Thus with a volume of up to 1200 litres of cutting oil per machine, around 50,000 litres are used rapidly in a short space of time. The universal usability of Motorex Ortho NF-X is a key advantage in this context, since it has meant that logistics and handling have been significantly simplified in the company. The 100% compatibility of the cutting oil with the specifications laid out by the Tornos development engineers is also a great advantage when carrying out the labour-intensive steps at the Technology Centre. In close collaboration with Motorex, these specifications were defined back in the development stage of the first prototypes with the lubrication technology experts from Langenthal.

Multi-purpose Motorex Ortho NF-X

With the chlorine- and heavy metal-free Swisscut Ortho NF-X cutting oil, Motorex has succeeded in perfectly machining high-alloy steel types or implant steels, as well as non-ferrous metals and aluminium, with one and the same cutting oil. This is an

All assembly work, including adaptation of the customer-specific peripheral equipment, are undertaken by trained experts in Moutier.

During commissioning, numerous set-up steps and checks are carried out. The machine is subsequently run in in a precisely defined process.

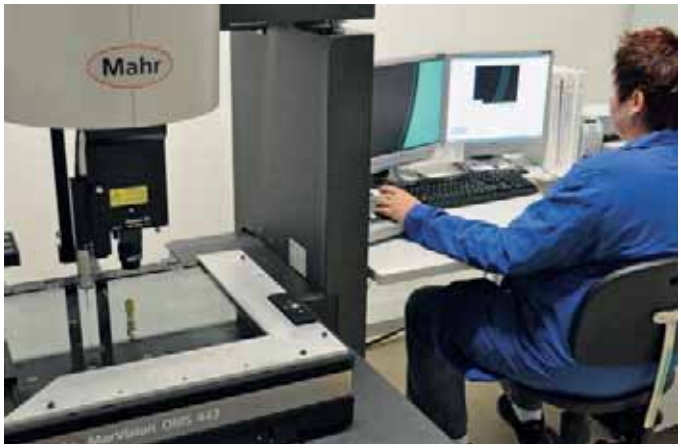
absolute first in modern manufacturing technology. This means that various types of time-consuming work are no longer required, e.g. separate production lines for mixed machining, washing of non-ferrous metal workpieces beforehand, and mixing different types of machining oils during the production process. Tornos therefore recommends using Motorex Ortho NF-X, and reiterates this in its operating manuals. This means that the customer is presented with a thoroughly tried-and-tested solution and enjoys the utmost process reliability.

Application under supervision

The final output of each machine is a comprehensive range of sophisticated parts made from a wide variety of materials. These applications correspond 100% to use in practice. Custom parts are often also manufactured and initial production runs produced at the Tornos site in Moutier. The result is measured precisely and documented with authentic test reports for every machine. This involves testing and repeating every single function. Similarly, operator errors are also reproduced in order to test the control stability of the machine.

Here, an expert is testing the geometry of a Tornos MultiSwiss 6x14. Without the use of computers and specially developed software, this would not be possible.

Several limited production runs of a wide variety of test parts are manufactured on each new machine and then precisely measured.



Using high-precision measuring tools, the manufactured parts are measured and recorded. The machines in question can thus be adjusted with absolute precision.

After the machine has become operational and has been approved, the cutting oil is removed by suction and the Tornos is partially disassembled once again for transportation. Once solidly packed, it is now dispatched to the customer.

Ready for dispatch

In accordance with the processes mentioned, the machine is emptied again, the cutting oil is micro-filtered and pumped back into the central tank at the Tornos Technology Centre. Commissioning the machine using Ortho NF-X means that all the oiled components are now ready for operation and are preserved until they are assembled at the customer's site. Exported components are provided with protection for transportation and, depending on their destination country, also provided with additional protection. The machine is then partially disassembled and packaged appropriately in the forwarding department

Initial filling at the customer's site

Precision, performance and process reliability are highly reliant on the cutting oil used, so it is worthwhile for every customer to use Motorex machining fluids, even at the final production site. Customers must therefore contact the relevant Motorex importer for their country in good time. This guarantees the required on-site availability of the cutting oil and ensures smooth commissioning in any given country across the globe.

Want to know more about the new generation of Ortho cutting oils, the scope for optimisation within your application area and your Motorex partner? Then get in contact with us at:

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ALPHA PRECISION TURNING & ENGINEERING SDN. BHD.

LIVING THE CORE VALUES

Incorporated in 1985, Alpha Precision Turning & Engineering Sdn Bhd (Alpha Precision) has become a leading force in the manufacturing of Metal Turning Precision Components by consistently providing competitive pricing, prompt delivery and excellent service to customers.

Located in Kulim Industrial Estate, in the Malaisian state of Kedah, Alpha Precision services important Mutlinational Companies in Malaysia. Alpha Precision also exports to various countries including Singapore, the People's Republic of China, USA, EC and Mexico.

Alpha Precision operates from two major plants of respectively 100,000 sqft and 300,000 sqft, both located in Kulim. Its workforce consists of 520 employees including 8 Mangers and 6 Assistant managers. Its install base consists of 415 machines of various types and brands, including 49 CNC Swiss Type Auto-Lathe. With 13 Tornos machines, Alpha precision is Tornos's major customer in Malaysia.

decomagazine met Alpha's Managing Director Mr. Lim Tham Cheng for a casual chat.

decomagazine: With so many types of machines, choosing a supplier could become challenging. What are your priorities when doing so?

Mr. Lim: The supplier must be able to meet our expectations in terms of technical demands by our customers. Whether the job is complicated, shall be done in one single operation, etc… We look at equipment that can do complex parts, front and back operation, cross milling, drilling with good accuracy. In the end, of course the price is an important criteria too.

dm: Why Tornos?

Mr. Lim: Tornos is a reputable company. We have known Tornos for many years as a manufacturer of multi-axes machines able to perform complex operations with accuracy.

dm: Who are your customers and what are their demands in term of technology or partnership.

Mr. Lim: Our customers are Mutlinational Corporations as you can see on our web site (www.aptesb.com). They are demanding high accuracy of +/- 5 Microns; we must be able to complete complex parts in one single operation on very hard materials such as titanium, inconel etc… They have their specific quality standards that we must comply with.

dm: Can you tell us about evolution and trends in your field?

Mr. Lim: During the first three years we were mainly operating with cam automatic lathes servicing the electronic industries and motorcycle industries.

We bought our first CNC machine with milling function in 1988 and we were producing stainless steel bushing for the walkie talkie handsets for Motorola. But today we are much more into various fields. So we are in motorcycle, automotive, oil and gas, medical industries and we are looking forward to enter the aerospace industry. Now we are looking to continuously put more value added to our production. We do not concentrate only on high volume simple parts. Yes, customers are asking for more value added such as surface treatment and packaging.

dm: How often do you change the application setup of your machines?

Mr. Lim: Most of the parts we are running are high mix low volume and the lowest volume we will produce for about two to three months. We like to keep some stock to avoid having to run the machine for fewer parts. With some customers we have 3 years contracts and customers without a contract usually will tell us in advance when the End of Life of a product will happen, so we can plan accordingly and don't keep obsolete stock.

dm: In your industry, how important is the cycle time?

Mr. Lim: Cycle time is of course extremely important so we can maximize the utilization of the machine.

dm: Today, which are the critical success factors for your company?

Mr. Lim: The most important is to meet customer's expectations in terms of quality, delivery, and of course ultimately the price. We also explore to increase our customer base. We hope to continue expanding in oil and gas, medical and hopefully aerospace. A good management is also essential, goals, objectives and values are clearely defined and our employees identify with them.

dm: Do you see changes in relations between subcontractors and customers in the future?

Mr. Lim: Most or our customers are consolidating their supplier base so they will want to select only the best vendors to support their needs. We see that smaller companies will disappear and only the largest ones will survive. This is the reason why we are growing, doubling our operation every five years. Currently we are capable of machining components from 0.8 mm up to 380 mm.

dm: What are the best tools for an industrial company to face the future with serenity?

Mr. Lim: Competent manpower and loyalty is the most important. Right now our key management staff have been with us for more than 15 years. Most supervisors have been with us more than 10 years.

dm: We see Tornos as a partner supplying value added to his customers. According to you, what should be this value added?

Mr. Lim: Tornos is supplying more complex machines that can meet requirements some other vendors cannot meet. Technology and knowhow is a value added. Service is important too. We are doing our own maintenance but use Tornos services for more complex problems.

dm: We talk a lot about innovation. According to you in which fields is innovation most important?

Mr. Lim: Innovation is important in term of manufacturing technology, higher accuracy and multi-operations.

dm: How important are motivation, team work and attitude when we are access to the most modern production tools?

Mr. Lim: Very important. It is no point having the most sofisticated equipment if you don't have the people to run it.

dm: How do you rate your operators training?

Mr. Lim: We have our own on the job training. We also send our people for outside training and to attend exhibitions.

dm: Are they easy to train?

Mr. Lim: You need at least 6 months to train a machine operator until they get independants.

dm: What is the general situation about training in Malaysia?

Mr. Lim: PSDC have been doing a good job. However many young people are not too interested in doing what we call the "blue collar job" and to work in shifts.

dm: One important business point is the partnership and transparency. What is your opinion on this?

Mr. Lim: From our experience the customers are squeezing us more and more and there is no such thing as transparency. We have to accept their condition on setting up a warehouse in the US and we have to accept their conditions of being paid 90 days after pick up from their warehouse. There is not much partnership. The business is getting tougher and tougher out there but we have to live with it.

dm: What is your opinion about "just in time".

Mr. Lim: We have what we call the lean manufacturing and we have been doing this since 5 years ago. For those regular items we keep maximum one to two weeks stock. For the low volume, less regular items we have to keep two to three months of stock.

dm: What are the general trends in Malaysia?

Mr. Lim: As we are exporting more than 80% of our production our internal domestic situation and trends do not affect us very much. We are exporting to more than 15 countries so the Malaysian and Asian economy is not so important to us. Our product mix helps us a lot.

dm: How do you see the future in general?

Mr. Lim: As our customers are looking at consolidating their supplier base we see increasing opportunities for us, as long as we can continue to be competitive and having the manufacturing technology. We need to supply to more sophisticated areas like medical industires, Dental industries and Aerospace. Those will be areas where, I believe, there will be more manufacturing bases shifting from Europe and Ameriac to Asia Pacific. And basically Malaysian labor cost is still competitive enough. We can still fight with China as long as our government continues giving us support, which I believe it will.

dm: Would you consider buying more Tornos machines in the future?

Mr. Lim: We are satisfied with the Tornos machines performances and services. Whenever our requirements are for high precision and high value added parts with single setup we would consider more Tornos machines.

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A SMALL FAMILY BUSINESS IS PRODUCING
A SOPHISTICATED RANGE OF TURNED PARTS

QUALITY THAT IS FLOURISHING IN OBSCURITY

Sellenrade, near Meinerzhagen, is in one of Germany's more secluded corners. Whoever has clambered up the hill along the narrow streets would expect to find an idyllic wellness hotel rather than an ultra-modern turning shop. And yet, or maybe for this very reason, Michael Schulte and his family produce highly complex turned parts with absolute precision and unbelievable flexibility here. They have thus gained a large and loyal customer base, with whom they have been working in partnership for several years. They have also similarly been working in partnership with the Swiss manufacturer of turning machines, Tornos, which has supplied the majority of the current machine inventory and has significantly contributed to the business's success.

Almost forty years ago, on 1st September 1972, Reiner Schulte, the father of today's managing director, founded a small business manufacturing turned parts in his father-in-law's joinery. Using four second-hand single-spindle automatic turning machines, he produced simple parts for the neighbouring lock and fitting industry. With commitment and skill, he lay the foundations for further growth. Reiner Schulte's son, Michael, became fascinated with turning technology very early on. By the age of thirteen or fourteen, he could already operate the machines and had learnt through play to work with the turning machines. After completing his apprenticeship as a cutting machine operator at a well-known lock manufacturer, Michael Schulte joined the parental business in 1987. Soon afterwards, in 1990, the first cam-controlled 6-spindle automatic turning machine was acquired to cope with the growing demand for simple mass turned parts. Over time, other machines were bought and six of them are still in operation today. Yet right from the off, Michael Schulte was convinced that the turning industry in Germany was undergoing change. Firstly, the parts are getting more complicated as people are trying to integrate more functions in smaller areas. This requires yet further and more complicated individual steps in one clamping arrangement. Secondly, the parts should be lighter yet always with greater load-bearing capacity and a longer service life. This explains the trend for new materials and the increasing use of high-alloy stainless steels. Thus, less bar-cutting steel is being used in Sellenrade but on the other hand more high-alloy and diverse chrome steels are being used instead. Last but not least, the batch sizes are being

reduced as mass turned parts are becoming rarer due to an increasing variety of products. This means additional set-up procedures for a turning shop, and these must happen in shorter intervals. According to Michael Schulte, these challenges could not be overcome with the current machine inventory, so he invested in a CNC-controlled single-spindle automatic turning machine.

Investing intelligently

Investing in a CNC automatic turning machine always poses a certain risk to small businesses. Apart from the significant amount to be invested, there is also a need to seamlessly incorporate the new technology in the current set-up, to calculate the orders accordingly, to maintain the usual quality standards and much more besides. The principle objective is to maintain the efficiency of the cam-controlled machines from a cost perspective, but also to become significantly more flexible in terms of production and equipment, to be able to split large orders without generating additional costs, to ensure simple programming, as well as to minimise tooling costs. When buying the first machine, Michael Schulte had to learn the hard way. Although the machine was technically sound and producing parts of acceptable quality, it was not quite enough for the qualified specialist. Quality is particularly important and Schulte does not show turning technology any mercy. Therefore, the first Deco Sigma 20 was bought in 2007. It took a long time to reach this decision as all the various angles had to be considered first. What range of parts would ensure the business's economic situation both now and in the future? In which tools and equipment will we need to invest, what is the situation with employees' qualifications, how much floor space is required etc.? As a co-operative supplier, Tornos solved all these questions.

The Swiss company assisted with the procurement process from the outset and was also the only provider that was capable of offering various scenarios. In contrast with other manufacturers, Tornos set itself the goal of providing the market with machines capable of precisely meeting customer requirements while also offering an excellent price-performance ratio. Michael Schulte finally opted for the Deco Sigma 20 that was still new at the time and is a true high-tech machine in the middle price range. He felt he was thus best equipped to produce highly complex parts cost-effectively. The last five years have proved him right. RS-Drehtechnik is now installing five of these machines and is one of the largest Deco Sigma customers in North Rhine Westphalia. Using the new technology, they were able to quickly expand their customer base, as they constantly trust the quality and unbelievable flexibility shown by the business, and Schulte is rightly proud of this.

Apart from the machines, of course, the experience and commitment of all those involved are also a decisive factor. The six employees are all passionately committed to the task in hand and all new challenges are competently tackled in a familiar atmosphere. They all have sound practical experience and know their machines very well. It is only in this way that it is possible to cost-effectively carry out up to 300 modifications per year. Of course, the consistency of the tools and the machine inventory programmes are also important.

But this is only the beginning

Though, or better said, because the business is currently doing so well, Michael Schulte is already thinking ahead. His two children are still only young but they are completely enthused by what their father does. He wants to incorporate them in a healthy business. Two Sigma 32 were therefore bought and their

part range can be increased from 25 mm diameter to 33 mm diameter. Using a concept combining up to eight front-drive tools, a roughing and finishing system, a 20 bar high pressure pump and the machine's high rigidity, Michael Schulte is now in a position to entirely produce large turned and milled parts on a single machine, and do this very economically.

For those who live in an attractive yet scenic area, the word sustainability is not fashionable, it is a necessity. Michael Schulte therefore values the Tornos machines because of their low energy consumption, low maintenance costs as well as the possibility to minimise material usage. His motto is "turning is a very complex topic." "We mostly begin with the most extreme way and then work from there towards the optimal result." As he examines processes holistically, he sees his five Sigma machines as an enormous benefit. The costs of documenting and tracking production processes are also significantly lower than if we were to incorporate machines from various manufacturers. Added to this is the fact that the tools and devices are all uniform, allowing them to be used across all machines, and that the simple programming is the same for all machines and can be performed by any one of the six members of staff, including the modest but very competent boss. Along with all the others, he feels responsible for the quality of his work, which incidentally is checked and documented on the most modern measuring machines. With this attitude and a strong partner in Tornos at their side, the third generation of the RS-Drehtechnik family will also be successful on the market and customers will continue to be inspired.

schulte
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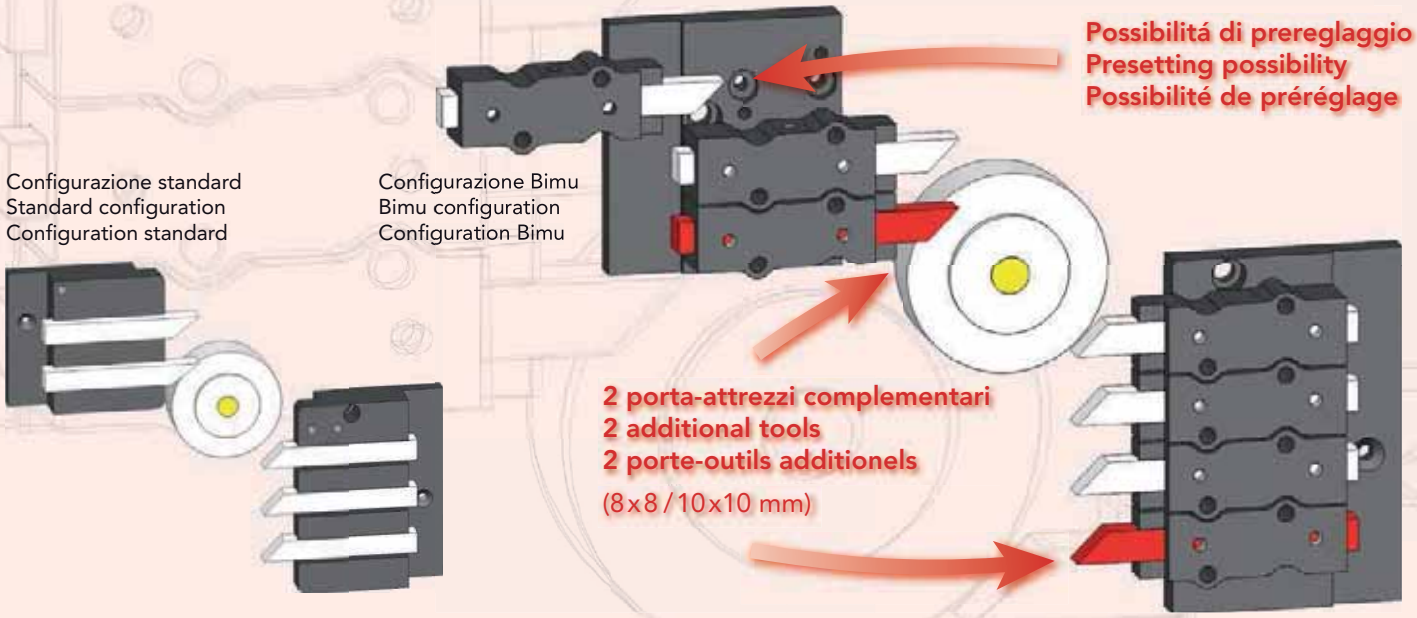

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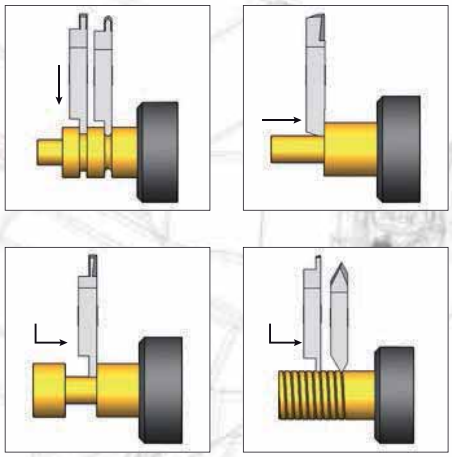
Porta-attrezzi di ripresa per contro-operazione
Turning tool-holders for counter-operation
Porte-outils de tournage pour contre-opération



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