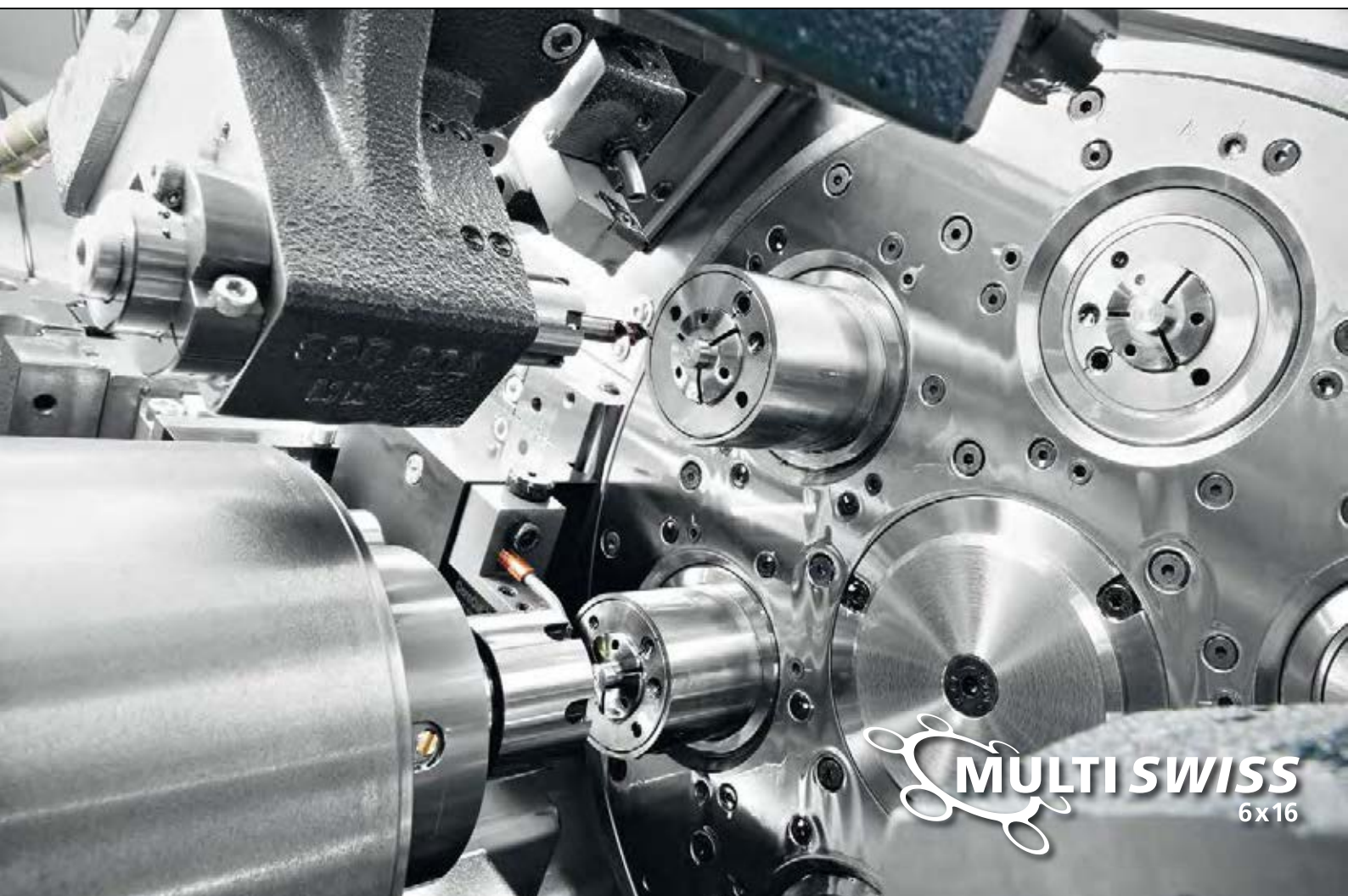


decomagazine

75 01/16 ENGLISH



MultiSwiss 6x16:
a new dimension



Swiss DT 26 –
Part of the next
generation of entry
level machines



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especially for
watchmaking



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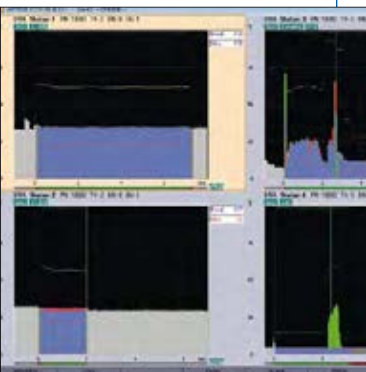


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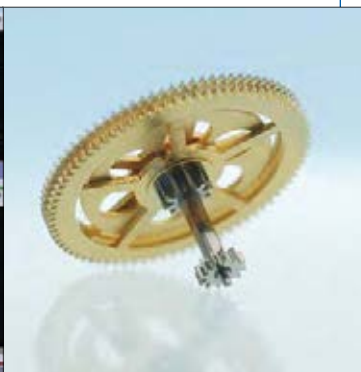
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MultiSwiss and torque monitoring – For optimum safety

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Azurea, a unique watch manufacturer

33



JT Dec – When bar turning meets the fine art of Watch making

41



Integrated Lubrication for the Tornos Swiss GT 26

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TORNOS: INNOVATION IN ALL AREAS

When discussing innovation, readers often imagine substantial modifications that revolutionise the market. Whilst a paradigm shift in technology isn't always possible, with the new MultiSwiss 6x14 we have certainly revolutionised the market. It is a real, groundbreaking innovation that quickly found its way into the workshops of our customers.

Innovation, however, can also be enhancements and modifications that sometimes may be almost imperceptible, but something that may noticeably change the user experience through product or service improvement. In this decomagazine edition, we would like to present some of the innovations that have recently been unveiled by our engineers.

MultiSwiss 6x16

On page 7, you can discover the new MultiSwiss 6x16. Based on the forerunner model with a bar capacity of 14 mm, this new multi-spindle machine offers the same advantages in terms of compact structure and performance as the first MultiSwiss – and even excels upon them.

Swiss DT 26

On page 11, the new entry-level machine by Tornos will probably attract your attention. With its bar capacity of 25.4 mm, this high-capacity 5-axis machine will be able to convince you of its capabilities.

TISIS

Moreover, you can discover on page 45 how CAM features can be integrated into TISIS with the aid of a joint development between Tornos and Mastercam.

Almac BA 1008

This machine is now presented with a new B-axis that adds to the 7 existing axes and it considerably expands the machining possibilities of this ultra-compact machine (page 15).



But innovation doesn't stop there; Tornos continually innovates in terms of organisation and management. This, for instance, applies to the new assembly line for the EvoDeco machines that benefit from the latest developments of lean manufacturing and therefore boast much shorter lead-times. This is combined with improved working conditions for the skilled personnel and it enforces our guarantee of quality.

The interviews in this issue will give you an idea of how our customers innovate in their workshops with our machining solutions. The articles about the suppliers of complementary products are also focusing on innovation to offer you the best results in your machine shop. These articles complement this 75th edition of our decomagazine, a tool that has been used for almost 20 years to keep you informed and up to date with our innovations.

We hope you will enjoy reading and we are looking forward to welcoming you at the upcoming exhibitions in Switzerland and around Europe as well as in the United States, South America and Asia.

*Rocco Martoccia
Head of Product Management
Multispindle*

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MULTISWISS 6x16: A NEW DIMENSION

Since it was launched in 2011, the MultiSwiss 6x14 has been very successful in the market and it didn't take long for the machine to become established as an efficient machining solution.



The hybrid technology of this machine is midway between a multispindle lathe and conventional Swiss-type lathe with a single spindle, making it suitable for a host of industry applications. Today, Tornos presents a brand new MultiSwiss machine, the MultiSwiss 6x16.

Cutting-edge technology

The MultiSwiss 6x16 benefits from many of the improvements that have been incorporated into the MultiSwiss 6x14 machine since its introduction. The basic structure is the same for both machines whilst the newcomer is able to meet even better meet

the diverse demands of the market. *"We are not just talking about a diameter increase to 16 mm"*, emphasizes Rocco Martoccia, Tornos' Product Manager of the multispindle division and originator of the MultiSwiss concept.

A unique concept

The MultiSwiss machine is not just intended for traditional multispindle lathe customers, its technology is suitable for bar turners who traditionally would have chosen an entry-level or mid-range Swiss-type lathe. Rocco Martoccia reveals to us that the MultiSwiss 6x14 machine must frequently compete

with 4, 5 or even 6 Swiss-type lathes. Sometimes, the MultiSwiss has to compete with Swiss-type lathes made by Tornos such as the CT20 or the Swiss GT 13 models. The right choice is not always as easy as the economic aspects, technical features and the machining strategies of the purchaser. Sometimes the demands of the Tornos end-user are dictated by their customers.

Space savings of 75% and 50% fewer operators

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

In the end, everything depends on the workpiece to be machined; very low unit costs can be achieved with this machine. Homogeneous production is what interests the customers in the automotive industry. The parts machined on a multispindle lathe have a lower risk of dimensional variance because the parts in a series run are produced on fewer machines by fewer operators. The ease of control of the machines during production should also be stressed. Instead of 4, 5 or even 7 set-ups on Swiss-type lathes, a single set-up will suffice with the MultiSwiss. The same applies to production monitoring. Only one single production process needs to be monitored while several machines must be monitored if you opt for single-spindle machines.

In plain language, only one single Gaussian curve must be monitored instead of several, which is the case when producing parts on several Swiss-type lathes. Mr. Martoccia explains: *"To make clear what this means, simply look at the operators who are required for production; the number of operators for the same lot size is simply halved and this is confirmed by all our customers that could reduce their fixed costs with this machine."*

A most welcome responsiveness

Machine users are increasingly focusing on quick-response production where they must quickly respond to the requirements of their customers. If 20,000 parts are ordered, one single set-up and 2 to 3 days of production will suffice with the MultiSwiss machine. In comparison, it would take more than 20 days for a Swiss-type lathe to produce the same lot size.

Extremely convenient set-up

Multispindle lathes may sometimes be a bit frightening. They are regarded as complex and difficult to set-up or to program and they seem to be restricted to large lot sizes. *"This prejudice is one of the most difficult aspects when discussing with our customers,"* stresses Mr. Martoccia and he adds: *"A great many customers are convinced that multispindle lathes are complex. This is definitely not true for the MultiSwiss. The machine is easy to handle and the front access to the machining area allows a clear view and good accessibility. Numerous customers e.g. use the MultiSwiss for series production as set-up can be realised much faster than on their*

TECHNICAL SPECIFICATIONS

MultiSwiss 6x16

Bar capacity	mm	4-16
Max. workpiece length	mm	40
Max. remnant length	mm	70
Max. speed of the motor spindles	rpm	8,000
Power of the motor spindles	kW	5.6
Torque of the motor spindles	Nm	7.5
Max. speed of the counter-spindle	rpm	8,000
Power of the counter-spindle motor	kW	5
Torque of the counter-spindle motor	Nm	6
Z stroke of the spindles	mm	50
Z stroke of the counter-spindle	mm	150

Swiss-type lathes." Programming as well is very easy since, in the end, the machine corresponds to 7 lathes with 2 axes each. This configuration can be admirably controlled with the TB-Deco software. The days of complex set-up works definitely seem to be gone!

Incredibly low wear

Hydrostatic technology enables the equipment of the MultiSwiss 6x16 with 6 sliding headstock spindles to each have their own Z-axis. As the cutting stress can be reduced through hydrostatic technology, wear can be reduced by up to 30%. *"We have customers who machine 200,000 workpieces made of stainless steel before changing the tool set-up,"* Rocco Martoccia emphasizes. Furthermore, the system is maintenance-free; the only thing needed is cutting oil. Expensive special oil thus does not need to be replenished and the cutting oil is not contaminated with another oil. Wear reduction is one thing that should be noted. This technology enables the MultiSwiss machines to achieve an outstanding surface finish. Moreover, it should be pointed out that shaping tools are not necessary for the MultiSwiss, so that substantial cost savings can be achieved compared to a cam-type multispindle machine.

An eagerly awaited development

After 4 years of market presence and more than 180 machines sold, the success of the MultiSwiss 6x14 is undeniable. But over the last few months, the Tornos specialists increasingly have received enquiries from customers who were looking for a machine capable of machining parts with diameters of more than 14 mm. Mr. Martoccia says: *"Given the increasing number of requests, we decided to transform the machine into MultiSwiss 6x16. For an increase of the bar capacity, a new bar feeder had to be developed. This new development gave us the opportunity to add some improvements. These include a new metallic keyboard that is resistant to all types of oil or alternately a touch pad for the highest ease of operation during program modification on the machine. Moreover, we had to make sure that the same machining performance can be achieved as on the 14 mm machine. Our highest priority was to achieve optimum performance even on extremely tough materials with a diameter of more than 16 mm."*

User-friendly software

To facilitate the use of the machine and to enhance its performance, the Tornos engineers provided a comprehensive software package including tool life

management software, automatic machine warm-up system, polar coordinate programming (transmit) function and C axis both for main and back machining. The Connectivity Pack enables remote monitoring of the production process of the machines from an office PC, tablet computer or cell phone. This had originally been developed for the Swiss-type lathes but is now available for the MultiSwiss machines.

Since its development, this new machine has had to pass a number of tests and now, the Tornos engineers are proud to unveil it. The machine is able to efficiently meet the most demanding customer requirements. It is not possible to convert a MultiSwiss 6x14 machine to a MultiSwiss 6x16 machine.

Even more comprehensive equipment

The MultiSwiss 6x14 has paved the way for the all-in-one concept. This means the machine is fully equipped with all peripherals needed for efficient production: bar loader, filter unit, heat exchanger, chiller, high-pressure unit and so on. As Mr. Martoccia concludes: *"This all-in-one concept has been very well received by our customers. The integral and compact concept helps to reduce the required floor space. Above all, the integrated peripherals have been perfectly dimensioned for the machine. The equipment on the MultiSwiss 6x16 machine is even more comprehensive. It particularly comprises various CNC software options as well as the Connectivity Pack."*

Presentation at SIMODEC 2016

MultiSwiss 6x16 will be making its world debut at the SIMODEC fair in La Roche-sur-Foron in hall A, booth C 27.

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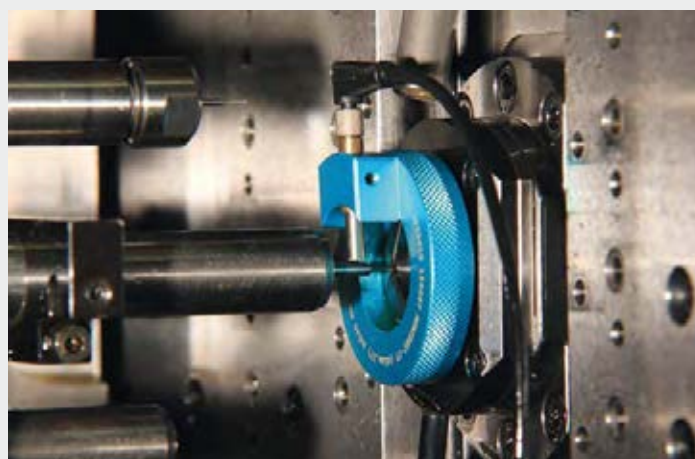
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SWISS DT 26 – PART OF THE NEXT GENERATION OF ENTRY LEVEL MACHINES

In the last quarter of 2015, Tornos launched its new Swiss DT 13 turning centre. The entry level addition to the Tornos stable has since proven so successful, that the company is now rolling out the much anticipated Swiss DT 26.



Since its introduction to the marketplace, the Swiss DT 13 has been well received by manufacturers from a diverse spectrum of industry sectors. As the next generation of entry level machines that will be a direct replacement for the previous Delta lines, the immediate impact of the first Swiss DT machine is credit to the tool displacement and kinematics. Both these features deliver astounding speed and productivity that is packaged into a robust and precise platform; because it is a major request from the market in this type of machines.

Re-engineered kinematics

Despite the positive feedback from industry regarding the Swiss DT 13, the development engineers realised that a larger version of the Swiss DT 13 wouldn't just be a case of building a larger footprint and bar capacity into the next machine. To turn bar up to 25.4 mm diameter with the lightening fast speeds of the Swiss DT 13 and also incorporate greater rigidity and an optimized chip flow mandatory for heavier cutting applications, the product development team re-engineered the kinematics



accordingly. The result is the launch of the Swiss DT 26. As always, the innovative engineers working out of Moutier, defied the convention that others follow. Most machine builders tend to build all models in the same range upon the same platform; at Tornos our logic was a little different.

Tailored design

With the launch of the new Swiss DT 26, Tornos now offers two machines that are based on the same aesthetics and design platform. However, the kinematics and dimensions are different. Why? Philippe Charles, head of Product Management Swiss-type says: *"We wanted to develop a high performance machine with exceptional power levels for turning bars up to 25.4 mm diameter. The challenge for our engineers was to exceed customer expectations and in the process, deliver a machine*

far better than our competitors whilst maintaining a competitive market price. The expectations from the market are different for a 13 mm machine and for a 25.4 mm machine. Whereas competitors base the design of a 20 or 26 mm machine on the same structure as a 12 or 16 mm capacity machine, the fine tuning of the kinematics on the Swiss DT 26 will give it a performance and productivity lead over alternate machines".

As an entry level 5-axis turning centre with two C-axes, and the big sister of the recently introduced Swiss DT 13, the Swiss DT 26 shares the good looks and appealing design of its smaller sibling. But the structural similarities end there. The new Swiss DT 26 has a larger working envelope to enhance operator visibility and access, it also provides more space for the chips that will be rapidly generated on the

machine. Unlike the smaller Swiss DT 13 that has had its footprint optimised with a depth of 870 mm, the Swiss DT 26 is 1300 mm deep. This expanded platform enhances rigidity and vibration damping, which gives the Swiss DT 26 precision, surface finish and even tool life stability over alternate machines. It also gives customers the ability to conduct heavier cuts at higher feeds and speeds.

To accommodate the heavy duty machining parameters of the new Swiss DT 26, the turning centre has a powerful 10.5 kW motor on both front and rear spindles that delivers impressive torque levels throughout the speed range from 0 to 10,000 rpm. The highly powerful spindle makes both the Swiss DT 13 and Swiss DT 26 the only machines in the 'entry level' class to derive such power levels.

Front and back operations on the same level

As usual with Tornos, both front and rear spindles feature the same high power, torque and clamping forces. For the customer, this eliminates any concerns over balancing the operations of each component between spindles. Whilst the Swiss DT 26 delivers exceptional power and torque levels, the smaller Swiss DT 13 derivative has a spindle of 4.0/5.0 kW and maximum spindle speed of 15,000 rpm for extremely high speed and feed machining of smaller parts.

As rear working operation is considered an equally important process as main spindle machining, Tornos has enabled the back-working stations to be equipped with rotating attachments that offer modularity. Additionally, the Swiss DT 26 incorporates a modular tooling configuration for both main and counter operations, which is unique for this range of machine. For the end user, this opens up a world of possibilities. It means the new machine can be equipped with a thread whirling attachment, a polygon milling attachment, a frontal milling unit or even a slotting device in counter operation. Combining this flexibility with 5 linear axes, two C-axes, 22 tool positions and up to 8 rotating tools, there isn't another manufacturer that offers this level of flexibility on an entry level machine. And if we didn't mention, customers have the option of running the Swiss DT 13 and Swiss DT 26 with or without the guidebush.

This emphasis on flexibility is built into every aspect of the new Swiss DT 26. For example, the machine offers a high level of autonomy with different options such as chip conveyors, oil mist extraction units, part collection devices and of course, our very own Robobar SBF 326 or a Robobar SBF 213 bar-feeding unit.

Ready for the machine shop of the future

Looking to the machine shop of the future, you can now integrate these new machines into your existing bank of machine tools with the help of the TISIS software package. Both machine can be programmed with the aid of TISIS. The TISIS connectivity pack that is fully conversant with the Swiss DT machines now features a lot of functionality. It also includes an Industry 4.0 module to measure the efficiency of the production process with the integration of cameras. If you want to learn how the new entry level Swiss DT 13 and Swiss DT 26 turning centres can enhance your productivity and flexibility, please contact your usual Tornos dealer.

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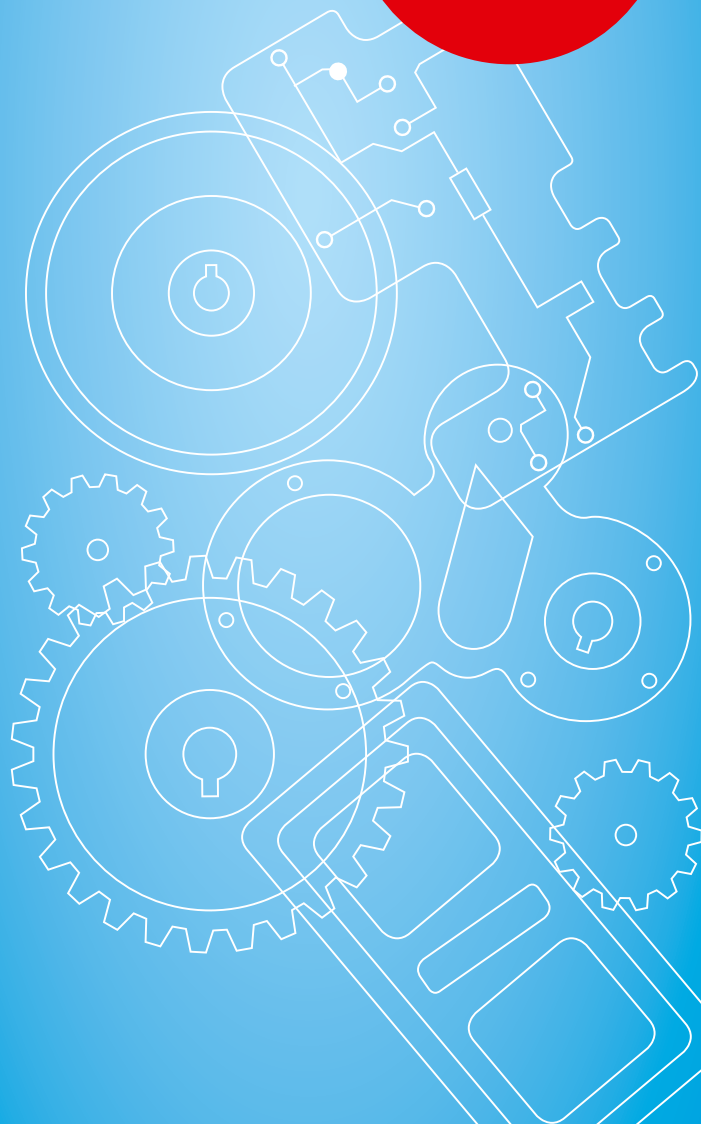
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A TILTING FRONT SPINDLE BLOCK FOR THE ALMAC BA 1008 MACHINING CENTRE

The new tilting front spindle block of the Almac BA 1008 machining centre was presented for the first time at EMO 2015 and it aroused great interest from show visitors. Apart from the 7 axes already available, the machine is also equipped with an additional and effective B axis that considerably expands the possibilities of this ultra-compact machine.



B axis for more flexibility and capabilities

Certain applications require front machining at an inclined position. This particularly applies to the watch making sector in the case of diamond polishing of appliques or to the medical industry when machining bone and dental implants.

Based on this observation, Almac has developed a front spindle block with a numerical linear axis that enables this spindle block to be oriented up to 17°. As this spindle block contains the pickup collet, inclined back and even lateral machining are also possible. Angular machining can therefore be performed on all sides of the workpiece.

A new NC unit is required

To enable the control of so many axes, the Almac BA 1008 had to be equipped with the latest gen-

eration Fanuc NC unit, the Oi-MF control. With this state-of-the-art NC technology, two-channel programming is also possible to provide a means to execute axis feed during machining and to enhance productivity. We will discuss this axis control evolution in detail in an upcoming Decomag issue.

ALMAC BA 1008: LARGE-CAPACITY FILTRATION TANK AND NEWLY REFINED PERIPHERALS

The Almac BA 1008 machining centre is compact and offers limited chip collection capacity in its standard version. For applications with low chip volume, the standard collecting container is more than adequate. However, if the chip volume is large, the container fills up quickly and this might affect the autonomy of the machine.

The present

An integral filtration system

To increase the chip collection capacity, Almac has developed a large-capacity peripheral filtration unit that both increases the autonomy of the Almac BA 1008 machining centre with regards to chip storage and adds a number of features such as temperature control of the cutting oil or chip discharge function for the buckets.

The figure below shows the large-capacity filtration tank that consists of a chip chute that discharges the chips from the machining area into the filtration bucket and also a large oil tank with a max. capacity of 60 liters. Also shown are a discharge station for proper discharge of the machining residues, a fine-filtration unit and a heat exchanger for oil temperature control.

The chip chute is used to discharge the chips from the machining area into the filtration bucket. The chips are thus removed in the first filtration stage by a filter bag in the recovery bucket. Several filter bags are available in different mesh sizes (100 µm, 50 µm, 25 µm).

The filtered oil is then cooled by the closed-loop heat exchanger. Thanks to this temperature control function for the cutting oil, the production processes can be optimized. In the filtration unit, the oil is then finely filtered before it is returned to the cooling nozzles by means of the return flow pump.

Ergonomics and design fully adapted to the Almac BA 1008 machining centre

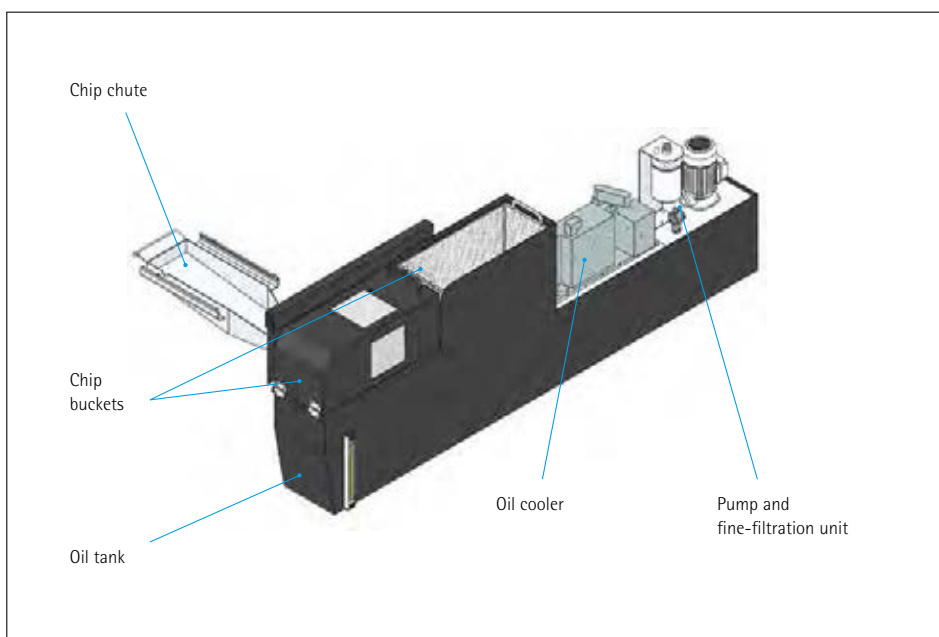
When the chip bucket is full, the operator can move it to the discharge station and install an empty bucket at the filtration position, so production can then be restarted. Thanks to the large size of the filtration buckets, operation is carried out in minimum time and with minimum changing frequency.

Apart from being very useful, this peripheral device is compact and is conveniently attached to the Almac BA 1008 machining centre without compromising its design and its ergonomic advantages.

Existing machines can be retrofitted with this large-capacity filtration tank, so do not hesitate to contact your Almac dealer to get more detailed information.



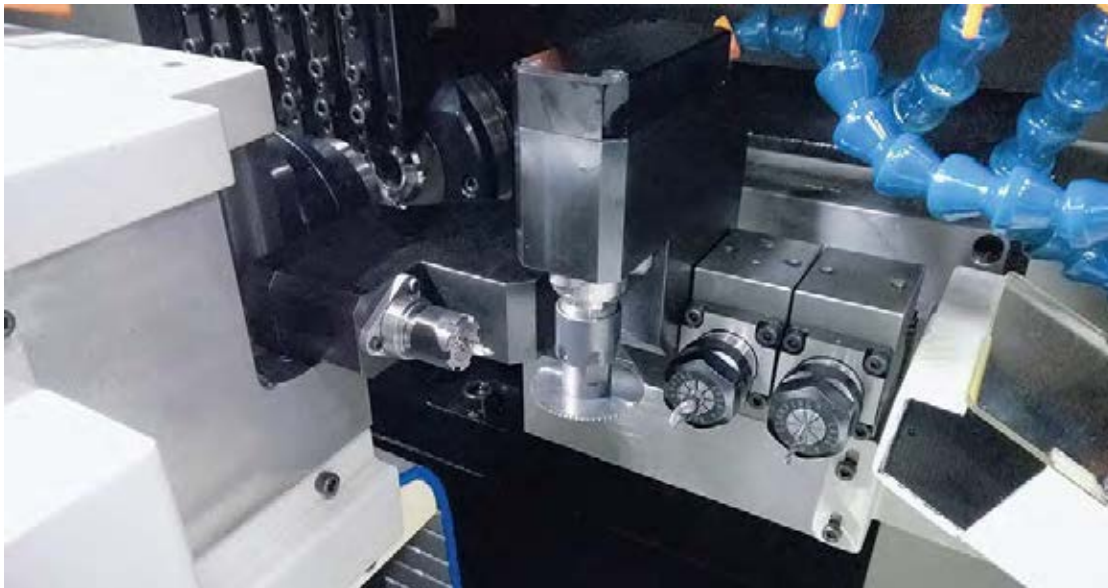
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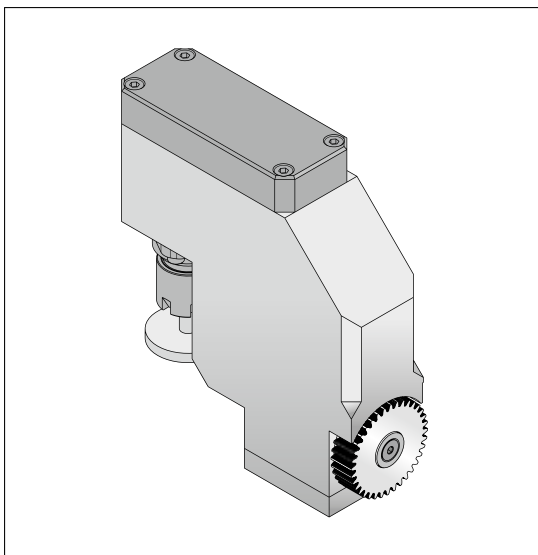


NEW RADIAL DRILL FOR BACK MACHINING ON THE TORNOS CT 20

With its proven and simple kinematics, its advanced machining capabilities and its favorable price, the CT 20 machine has already convinced a great many customers that have bought this exceptional machine.



And to even round off the capabilities of the machine, a new option is now being offered: A radial drill/slotting tool for back machining.



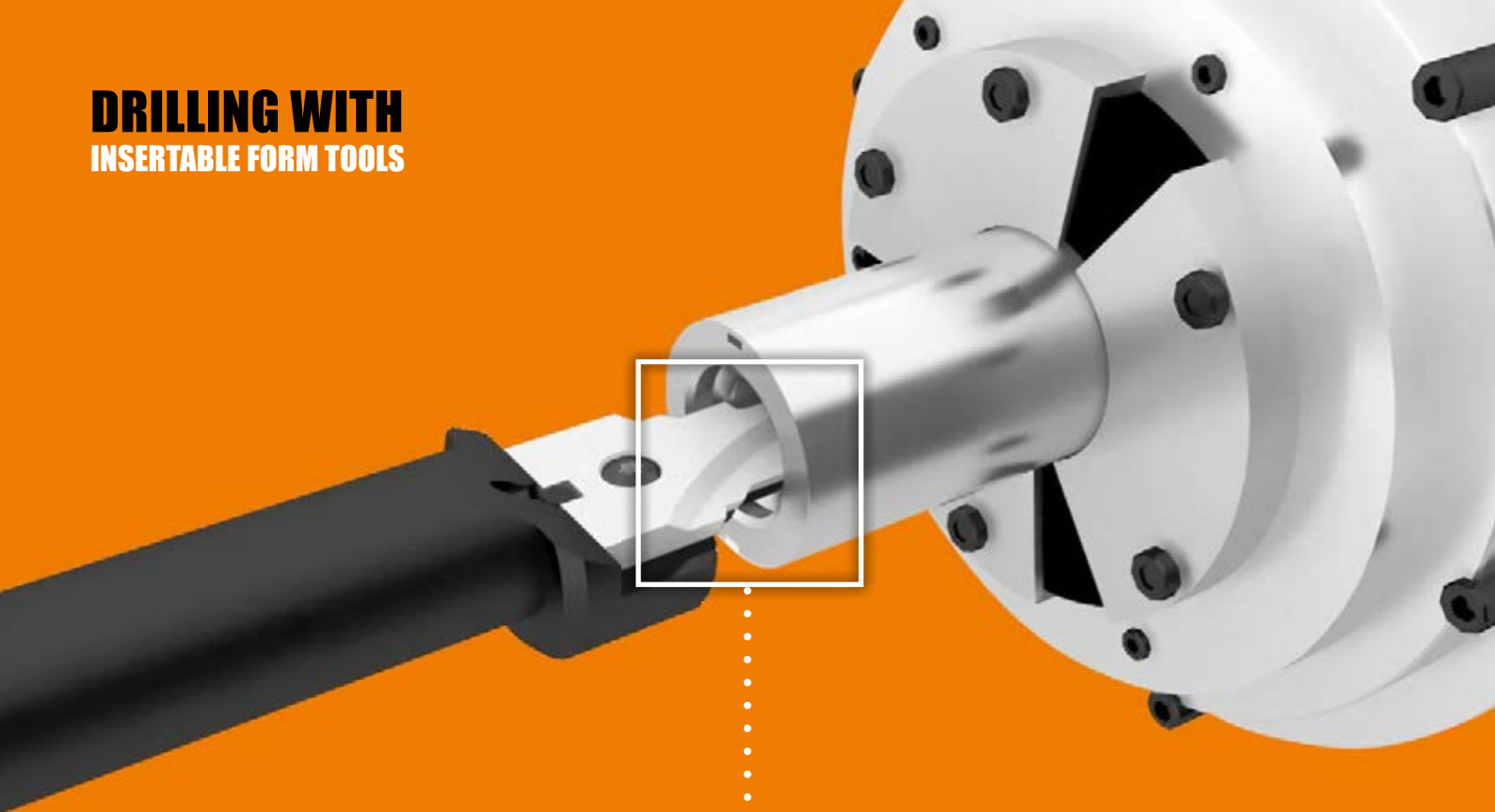
A most welcome complement.

With 26 tools and 10 of its stations capable of accepting driven tools, the CT 20's tooling capacity is already impressive. For main machining, the machine actually has 4 radial drills while two additional rotating drill bits can be mounted on the counter-spindle carriage (option). Finally, the machine accommodates 4 front drills on the spindle block for back machining.

To round off this tooling, a radial drill will now complement the machining capabilities of the CT 20 for back machining. *"With this new device, our customers will be able to produce an even broader range of parts; it even expands the machine's scope of application,"* asserts Philippe Charles, Tornos' Product Manager of the Swiss-type lathe division.

The device can be installed at an angle of 90° or 45°. Thanks to this trick, two devices can be mounted on the spindle block for back machining. Do not hesitate to contact your nearest Tornos representation, if you want to get detailed information on this innovative new device.

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HIGHER PRECISION, ESPECIALLY FOR WATCHMAKING

Given the evolution experienced by the watchmaking industry, the arrival of automation, the spread of SPC and tolerances that sometimes are reduced to just a few micrometers, the management of the company Monnin SA in Sonceboz looked for and finally found a means of production that perfectly meets these very demanding requirements. We are meeting Mr. Michel Marrucia, Managing Director, and Mr. Olivier Steffen, Production Manager.



After several months of testing with the Tornos SwissNano machine, the company management decided that this machine comes up to all their accuracy requirements, both in terms of diameter, length and repeatability. Since deciding on the machine, the company has since employed nine SwissNano machines in its workshop; and for the next year the installation of eight further machines is planned, unless the economy will develop adversely.

Exactly keeping tolerances in a repetitive manner

Monnin SA has several workshops with a total of more than sixty NC machines and around one hundred cam-type machines. It has now replaced eight of its cam-type machines with SwissNano machines. *"In view of assembly automation, our customers do*

not only expect very tight tolerances but they want us to keep these tolerances. On a workpiece made of stainless steel with a tolerance of $+2/-3\mu$, we typically keep a Pp value of 1.47 and a Ppk value of 1.27," the Managing Director declares. As a consequence of these requirements, the SwissNano machines are progressively replacing the cam-type lathes. Thanks to their smaller footprint, replacement in the workshop is possible without any space restrictions.

Well thought-out organization

An SPC measuring and monitoring system has been installed. The company is equipped with networked measuring devices that are connected to the central system to enable the operator to monitor the production process. This ensures quality, repeatability



and traceability. The quality requirements are also subject to visual inspections. *"Each workshop works like a mini enterprise being responsible for its quality and its deadlines and the skilled staff working here undergo regular training to ensure proper adaption to the constantly changing demands of our customers,"* explains Mr. Steffen.

Promotion of expertise

"I'm always telling my colleagues that without them, all these beautiful watches that can be seen on high-gloss paper together with attractive actresses and actors, were like a car without an engine," the Production Manager adds. And that's the absolute truth because the skills and the motivation of the employees of Monnin SA to do a good job are unique features of the company. At Monnin SA,

the operators are trained to be specialists for the workshop in which they are employed, i.e. technicians working on SwissNano machines are equally qualified for cam-type machines. *"Our organization is based on production cells and batch sizes. This means that our operators of cam-type machines had to get accustomed with SwissNano. This transition went fast and smoothly,"* the Managing Director explains.

SwissNano: fast acceptance

The basic idea underlying the acquisition of SwissNano was to replace a cam-type machine (for reasons of quality and repeatability as mentioned above). The first person who had to be convinced of the capabilities of the machine was the head of the cam-type machine workshop. He was skeptical

A FEW FACTS ON MONNIN SA

Staff:	115 employees
Business areas:	95% watchmaking, microtechnology, medical technology, connection business
Diameter of the machined parts:	from a few tenth to 20 mm below 2 mm for 80% of the workpieces
Workshops:	2 large bar-turning workshops 1 workshop for polishing and thermal treatment 1 workshop for refinishing, assembly, grinding and decoration 1 workshop for ball bearings 1 workshop for gear hobbing (for finishing works e.g. after the electroplating stage)
Swiss-type lathes:	85 CNC machines, including 33 Deco 10, 18 Micro 8, 1 Micro 7, 1 Deco 13 and 9 SwissNano machines as well as approx. 100 Tornos cam-type machines.



about the capabilities of this small NC machine as *"you can do all tasks on cam-type machines and you can do it for less money"*. But what a difference after a few workpiece batches! With the first machine, all workpieces were finished, all delivery deadlines were met without any discussion, SPC was implemented smoothly and burr problems as well as problems of potential deviations by several microns that often occur with cam-type machines were solved. The machine was accepted and adopted in no time!

Most pleasing ergonomics

For an operator that is used to working with cam-type bar-turning machines, the SwissNano is ideal, as he can maintain his usual reflexes and habits; he can go around the machine and work from all sides while the machine access and visibility are outstanding. Mr. Marrucia explains: *"It is said that this machine was developed in cooperation with practitioners, and now, after we have seen and worked with it, we can say the following: At last, we got a machine that exactly meets our needs."*

Interesting possibilities

Mr. Steffen talks about the possibilities offered by SwissNano: *"Compared to a cam-type machine of the same footprint, SwissNano offers true in-process back machining and can finely adapt all machining conditions. This enables us to reach a surface finish that does not require any subsequent polishing or mirror finishing. In the near future, we will install several machines to test them for other machining tasks such as gear cutting, cross drilling, milling and threading."* He adds: *"Sharp tapping edges, which are a problem often experienced with cam-type machines, are completely eliminated when producing with SwissNano machines."* Although the replacement of cam-type machines has been a huge

challenge for more than 20 years, the experts of Monnin SA think this challenge has now been overcome with SwissNano.

TISIS tracking software

After a first machine has been equipped with the Connectivity Pack, the Production Manager makes clear: *"We are discovering the advantages of connectivity. We are currently in the TISIS testing phase. At first glance, it is very interesting and well-thought-out for all issues relating to production management and monitoring. If we will see a good opportunity to imbed it into our processes, we will equip all our machines with TISIS, however it is too early to talk about a final decision."*

A highly responsive and stable machine

Mr. Steffen declares: *"When implementing a correction by half a micron, the machine reacts immediately and very precisely. Thanks to its high stability, we can guarantee utmost precision over the whole machine life."* And even if Monnin SA has a number of machine models, SwissNano certainly is the most precise and stable machine. Up to now, the company has been using this machine to manufacture parts of rather simple geometry (screw pads, screws and pins) but with high demands on accuracy.

Excellent cooperation

Asked about the relationship with Tornos and the provided global service, our two interlocutors agree: *"From the very beginning, we have been fully satisfied. We have established good contacts with Tornos and the deadlines are met. Some teething troubles with the first machines were resolved fast and effectively. We hope Tornos will keep holding on to the SwissNano series for a long time as we firmly believe in this machine."*



Service that goes even further

Today, the company Monnin SA boasts a well-filled order book, but the managers do not rest on their laurels, quite the contrary. The mere supplier for the watchmaking industry of earlier times that only offered bar turning is becoming more diverse to be able to offer more to its customers. Today, the production is completely vertically integrated and numerous departments, especially the polishing, gear cutting and assembly departments, complement the mere bar-turning business. With the largest share of the sales volume, the watchmaking industry is still the main target group, while other customers come from the microtechnology and medical industries or the connection business.

"We have established a separate department for the manufacture of micro bearings that comprises all operations, especially assembly and automated welding," the Managing Director concludes on this topic.

Working hand in hand

The working circumstances in the watchmaking branch are changing; today, it is not unusual to sit around the table with the customers to participate in their development meetings. *"This is quite a new approach that requires openness of all participants. It enables us to keep the unit costs under control and to improve the products while avoiding excess quality. We are fully committed to a logic of partnership,"* Mr. Marrucia explains. And he concludes: *"Everyone must understand exactly the challenges and constraints and this is why we want to be transparent in our in-house communication. We share our knowledge and this is the best way to provide our work with a meaning and to meet the requirements."*

THE STRONG POINTS OF MONNIN SA

We asked our interlocutors to summarize the strong points of their company:

- Large range of products
- Delivery of finished or ready-for-installation parts or assemblies
- Highest precision, quality and repeatability and documentation of the attained values both for machining and assembly
- Comprehensive inspection possibilities, including visual inspection and 100 % inspection to ensure zero PPM
- Perfect statistical process control
- Adaptation to constraints and constantly changing customer requirements
- Partnership with the customers to ensure optimum quality in consideration of requirements and price.



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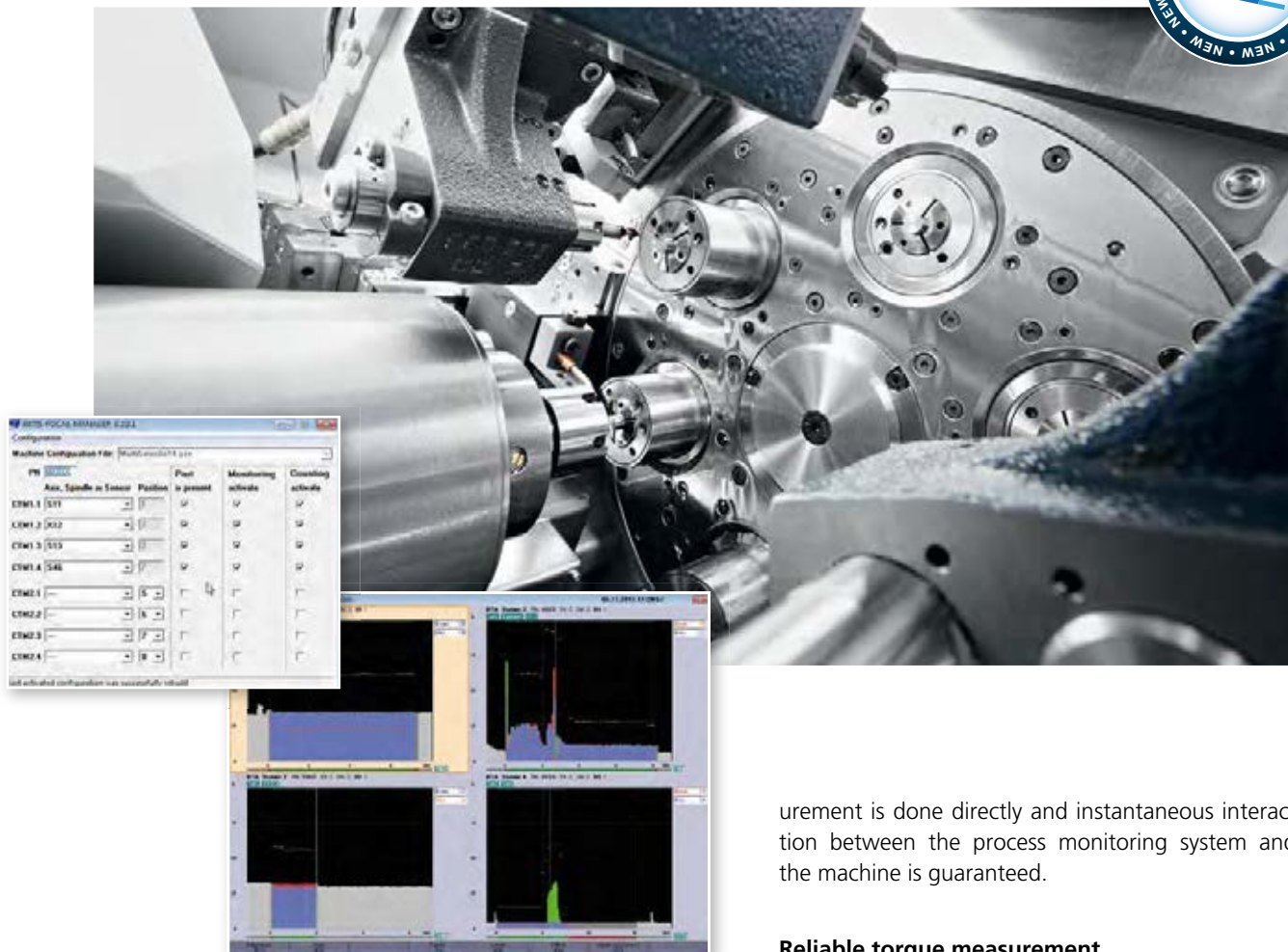
High-performance
Swiss-type lathe

Swiss DT 13

The present

MULTISWISS AND TORQUE MONITORING – FOR OPTIMUM SAFETY

Production processes are sometimes complex and may require advanced monitoring strategies.



For this reason, Tornos offers the ARTIS process monitoring system for its multi-spindle turning range. This software perfectly matches the MultiSwiss 6x14 and MultiSwiss 6x16 machines.

Real-time process monitoring

The ARTIS system monitors the machining process in real time. Monitoring starts in a reliable manner from the very first part. For process monitoring, responsiveness is vital. The sooner the type of process malfunction is detected and the sooner the machine can be stopped, the less damage is likely to be caused. In the case of Tornos machines, meas-

urement is done directly and instantaneous interaction between the process monitoring system and the machine is guaranteed.

Reliable torque measurement

The CTM card boasts a proven digital torque measurement system, the Digital Torque Adapter (DTA). This system developed by ARTIS allows the motor output to be displayed directly on the terminal of the machine control unit. No additional sensors are required here. The system is extremely flexible. With a single click of the mouse, you can change from one axis to another and from one spindle to another one – a step that was absolutely inconceivable before.

The fast implementation of optimum process monitoring also inspired the Tornos engineers: the Self Adjusting System (SAS) automatically sets the essential parameters and is learning continuously while the process is executed. This enables the fast start-up of the process monitoring system. This

system has already proved its merits in the Tornos MultiSigma and MultiAlpha machine models. This innovative technology is already being used by a number of customers.

Perfect integration

The ARTIS system can be perfectly integrated into the MultiSwiss machine and by default, it is equipped with an industrial PC that is compatible with the ARTIS software; the card is located in the interior of the control cabinet.

The ARTIS system is available in specifically adapted versions for the MultiSwiss, MultiSigma and MultiAlpha machines. For detailed information, please contact your nearest Tornos representation.

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BENEFITS FOR THE CUSTOMERS

- Protection for the machine and cutting tools
- Tool breakage and missing tool monitoring
- Tool wear monitoring
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- Optimum utilisation of tool life
- Process analysis based on compiled statistics and process documentation (optional)

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MAKE THE DIFFERENCE – TORNOS TRAINING

Just like the technology, the market is rapidly evolving. Training intended to keep the user's skills up to date often enables the programming times to be reduced and the productivity of the participants to be significantly enhanced.



For a long time now, Tornos has been committed to training, so every Tornos subsidiary is able to provide high-quality training. Simon Lovis, head of the training department in Moutier, explains: *"Apart from bringing the user skills up to scratch, training will keep your staff motivated. The secret of success lies in well-trained and motivated staff. This really can make the difference in the market!"*

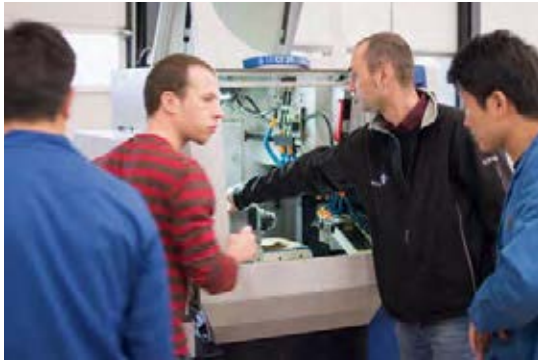
100 years of experience to the customer's benefit

Worldwide, Tornos has 12 training centers and in each of them, high-quality training is provided by highly qualified instructors. Irrespective of the industry – medical technology, watch making, automotive, aerospace industry or micro-components – the company supports its customers to enable them to get the most out of their Tornos machines. With each training course, the participants get state-of-

the-art training tailored to their specific needs. At the end of the training course, they will get a certificate.

Two training levels

Potential participants can choose between two training levels: basic training and advanced training. The contents of the advanced training courses for both maintenance and programming are tailored to the specific requirements of the interested customers. The training contents are application-oriented. *"We favor a practice-oriented approach and small groups to be able to offer customised support,"* emphasises Mr. Simon Lovis and he adds: *"Our training courses are based on an educational approach to ensure maximum efficiency for the participants. With each training unit, the participants get customised high-quality support."*



Maintenance training

Professional training for mechanical and electrical maintenance enables the maintenance staff of the workshop to shorten the maintenance times. This increases machine availability and significantly extends the machine service life. It is an effective means to guarantee production reliability. The provided training courses are very much focused on practice. Thanks to the customised support, profound skills are acquired.

Programming training for TISIS or TB-Deco

Programming, set-up and operation training for Tornos machines is offered in modular and practice-oriented training units. Programming training is provided in the ultra-modern training rooms at each Tornos subsidiary. With regards to TB-Deco or TISIS software products, programming is done on the same control panels as those with which the machines are equipped.

Training for industry 4.0 with TISIS

Beyond 'basic' programming, the training provided may be expanded by future topics associated with TISIS and the Connectivity Pack. Production monitoring, machine networking and efficiency measurements are further topics that are addressed by this training course.

Training tailored to specific applications

M. Lovis concludes: *"We also offer specific training courses for various technologies such as thread whirling or gear cutting."*

For detailed information, please contact the Tornos experts at: <http://www.tornos.com/en/content/training>.



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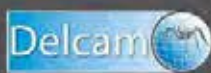
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AZUREA, A UNIQUE WATCH MANUFACTURER

Azurea is a company that was founded more than 100 years ago and it has steadfastly remained independent. Something that is demonstrated by the fact that all shares are held by the Executive Management and the Board of Directors. Specialising in the production of watch components, Azurea has implemented vertical integration of the manufacturing stages for its parts to ensure the independence of the company and to guarantee short cycle times.



This feat makes the company highly responsive to the extremely demanding requirements of its customers and enables it to offer a vast range of different components. Azurea heavily invests in its human resources and believes the highly skilled staff are the heart of the company and the business does everything in its power to ensure consistent staff training.

At present, the company is manufacturing at four production sites: three in Switzerland and 1 in Portugal. Working in the fields of watch making, equipment industry and gauge and measuring device production, Azurea has a historic site Moutier where production is focused on movement components for the most important watch manufacturers. At the site in Bévillard, the company activities

comprise of any subcontract work relating to the equipment industry for a large number of extremely diverse customers. The latter come from varied fields such as medical, aerospace and automotive industries.

The company's site in Porto is equipped with state-of-the-art technology. Gauges and measuring devices are produced in Belprahon, a village located at a stone's throw from Moutier.

Based on its vast expertise and on more than 100 years of experience, the enterprise is extremely flexible and responsive with regards to the demands of its customers.

Azurea does everything in its power to control the technical processes by sustained and target-oriented investment; advanced technological monitoring is



THE STRONG POINTS OF AZUREA SA

Over the years, the Azurea Group has gained vast skills and this know-how makes the company truly unique.

- Assembly
- Quality control
- Bar turning
- Watch decoration
- Engineering
- Electrical discharge machining
- Engraving
- Measurement engineering
- Polishing
- Thread rolling
- Gear cutting
- Surface treatment (gold plating, nickel plating, rhodanizing)
- Heat treatment/bluing
- CNC machining
- Face lapping

TORNOS MACHINE FLEET

- 26 Tornos Deco 10 machines
- 2 Tornos Deco 13 machines
- 6 Tornos SwissNano machines
- 4 Tornos EvoDeco 10 machines
- 1 Tornos EvoDeco 16 machines
- 3 Tornos MultiSwiss 6x14 machines

All in all, Azurea owns 88 CNC machines and 19 cam-type machines that are still in operation.

implemented to ensure optimum efficiency in its production departments. Given its perpetual striving for excellence, it was not surprising that the company took notice of the impressive Tornos MultiSwiss 6x14 machine.

Usually, multispindle machines are widely spread in the automotive industry. In the watch making industry, this kind of machine is rarely used. If such machines are used at all, they are to found in the large batch production of winding buttons and screws. Accustomed with the technical challenge, Azurea took up the gauntlet and began to produce a barrel drum by gear cutting on a machine – this is made possible by the Y axis option on the MultiSwiss.

The MultiSwiss boasts a unique machine concept with its 6 spindles. Each spindle has its own Z axis, the machine comes close to a classic Swiss-type lathe. Moreover, it boasts optimum accessibility and is easy to manage. Programming is done





sequentially, the TB-Deco software brilliantly performs synchronization and the machine can be programmed directly via its PC.

The hybrid configuration of the MultiSwiss enables the operators to easily switch from a Swiss-type lathe to this multispindle machine. In addition, two operators can easily operate the 3 machines; this ratio would be less favorable if single-spindle lathes were used for this type of workpieces.

"Yes, we have focused on the MultiSwiss because this is the only machine that was able to satisfy our needs," Mr. Uhlmann, CEO of the Azurea Group declares. "We needed a machine that was able to produce large batches with uncompromising quality. Eight to 10 high-end single-spindle machines would probably be necessary to achieve the productivity that is offered by our three MultiSwiss machines. Considerable footprint saving is another benefit that speaks in favor of the MultiSwiss. With its integral peripheral devices, the machine is extremely compact," the CEO concludes.

Despite the high throughput, the part quality obtained is equivalent to the quality that is achieved on single-spindle machines. The MultiSwiss thus does a perfect job and effectively and rapidly responds to the demands of Azurea's customers.

For detailed information on Azurea, please refer to the www.azurea.ch website.



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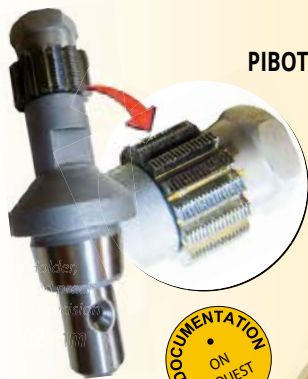
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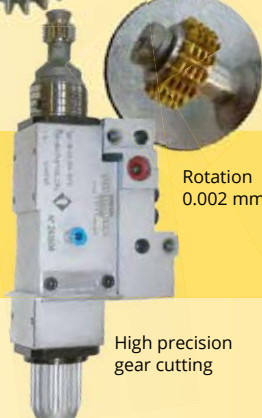
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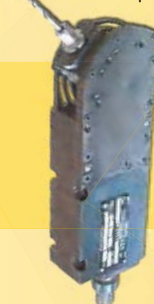
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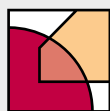
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JT DEC – WHEN BAR TURNING MEETS THE FINE ART OF WATCH MAKING

Watch parts are among the most complex parts that can be manufactured. During production, the requested part sizes and precision levels impose numerous challenges for bar turners. The difficulties encountered make it more like an art rather than a technical skill, especially when given the specific features of each individual part.



Jérôme Alonzo, DEO and Damien Struchen, apprentice.

Today, these manufacturers must be able to maintain sub-micron precision to meet the demands of the renowned watchmakers. To reach such a level of excellence, in 2012, Tornos presented a machine that had been designed in cooperation with experts of the watch making industry, the SwissNano. Special emphasis had been laid on precision and stability. Since that time, this machine has proved its merits and found its way into the world of watch making. The fact that most of the customers already bought at least a second machine proves the optimum suitability of this machine for its target market.

Besides its technical features, the SwissNano machine offers another benefit, its highly com-

petitive price. This is the aspect that has convinced Mr. Jérôme Alonzo of the JT Dec Company, in the first place. He was looking for a flexible and cost-efficient high-precision machine that was intended to further his newly-established company. Mr. Alonzo planned to conquer a market that is even more demanding than watch making: high-end watch making.

In November 2014, the machine was installed on the premises of the JT Dec Company in the French village of Le Russey, just a few kilometers from Switzerland. Since then, Mr. Alonzo has already manufactured more than 150 different batches on his SwissNano machine culminating in more than 200, 000 pieces in total.



decomagazine: Mr. Alonzo, could you please briefly introduce JT Dec to us?

Jérôme Alonzo: JT Dec is a young company specialising in the production of complex parts that have to be manufactured with very tight deadlines. It even occurred whereby a customer collected his prototypes himself at the side of the machine to be able to assemble them in time for an exhibition.

With our rather small machine fleet, our production is primarily focused on prototyping of watch parts for manufacturers of high-end and luxury watches. In the end, we produce parts that the large manufacturers could not produce within the deadlines requested by the customers. This is because they considered them to be too complex. We are able to machine all types of materials, sometimes even precious metals.

In addition to ultra-precision and the required perfect surface finish, the high complexity is another feature of the parts needed for high-end watch making. Such parts, by the way, are located at the boundary between watch making and jewelry.

dm: That means you are working exclusively for the watch making industry?

JA: Not only for watch making, but we also produce equipment parts, especially on our ENC 74 or on our cam-type lathes. Moreover, we make small parts for machine tools. In these fields as well, just as in the watch making industry, our strength lies in our capability to meet the deadlines. We mainly machine stainless steels as tough as 304L steel. We are even familiar with the machining of materials such as PEEK. However, it is true that movement parts of watches are our specialty and in this field, we are able to produce any part. This could be wheels with responsive arm, sliding pinions, watch pins, screws, pinions, pallet shafts and so on. Here as well, our strength is manufacturing complex parts that require unique machining operations such as gear cutting or milling. For that matter, we leverage the excellent gear cutting capabilities of our SwissNano machine.

dm: You have a large number of inspection instruments. I assume that the quality of the manufactured parts is very important for you?

JA: Quality is our highest priority and an indispensable prerequisite for our customers to obtain satisfactory results. Our workshop is equipped with a digital measurement system as well as various high-tech monitoring devices.

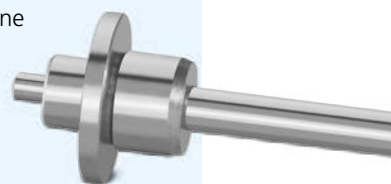
dm: Apart from CNC and cam-type machining, do you have other skills such as watch finishing operations?

JA: Yes, we do. And we are going to strengthen this activity with the establishment of a special department for watch decoration and polishing operations as well as assembly works. We are able to offer various in-house finishing operations to ensure optimum service for our customers.

JT DEC'S MACHINE FLEET

- 4 cam-type lathes
- 1 Tornos SwissNano machine
- 1 Tornos ENC 74 machine
- 1 Tornos Deco 13 machine

Founded in July 2014



dm: Did you adapt the Tornos SwissNano machine to your production of watch parts?

JA: Yes, the machine is well suited for our requirements. It has been designed for such tasks but in our sector, the parts are very complex and we must push the machine to its limits to be able to satisfy some customers. Up to now, SwissNano has proved to be a very reliable partner. It has enabled JT Dec to meet the demands of its customers in time and with the desired quality.

Furthermore, the machine is really compact and ergonomic, which is a clear advantage for small workshops like ours. In my mind, this is the only machine with such a good accessibility available in the market. For instance, the fact that the operator can see the face of the guide bush significantly facilitates set-up work and enables us to save valuable time.

dm: And you perform all types of operations on this machine?

JA: Yes, we are making use of all facets of the machine and, as I already mentioned, we are performing a great deal of gear hobbing on it. In addition, the machine is used for milling and polygon operations. It is equipped with 2 high-frequency spindles that enable finish milling or ID thread whirling operations for threads down to S0.30 (see below). The polygon cutter has also proved to be particularly useful when machining the threads of screws that are used for watch making. As for the watch pivots, we can turn them with diameters of down to 6 hundredth.

dm: Did you have the opportunity to test the SwissNano machine in production over several days? How did it behave during production?

JA: During the first 15 minutes of production, monitoring is required to ensure homogeneous production. After this period, the machine has gained dimensional stability. It can then operate almost autonomously. During weekend production, the machine can maintain micron accuracy without difficulty.

dm: Do you use the TISIS programming software?

JA: Yes, we do. It is a very good programming aid that enables us to work with extremely tight deadlines. For me, it is very useful that I can completely prepare my program on my PC while the machine is producing. I can both program my machine and simulate the tool paths. This leads to significant and profitable time savings compared to on-machine programming. Moreover, I know exactly how much time the production will take and therefore I can offer my customers precise deadlines, which is another advantage for me.

dm: What do you think is the particular strength of Tornos?

JA: The service! It is true, JT Dec is just one hour's drive from Moutier, but the service is really very responsive and the hotline support for software and machine is simply excellent. This is a plus that sets Tornos ahead of the competition.

JT Dec thus stands out for its proven high-quality service and responsiveness. The clustering of its various activities under the same roof as well as the use of advanced means of production such as the SwissNano, provide the company with a bright future. Mr. Alonzo will be glad to assist you should you need detailed information.



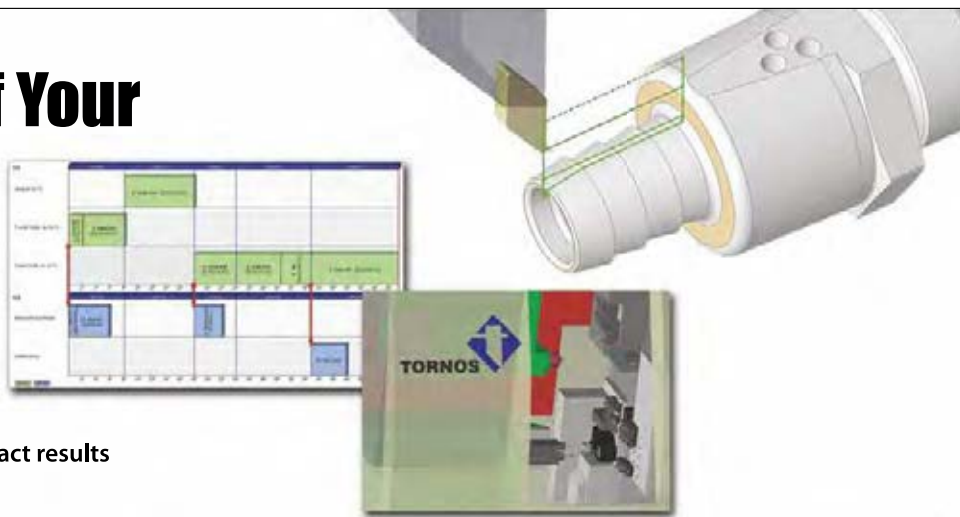
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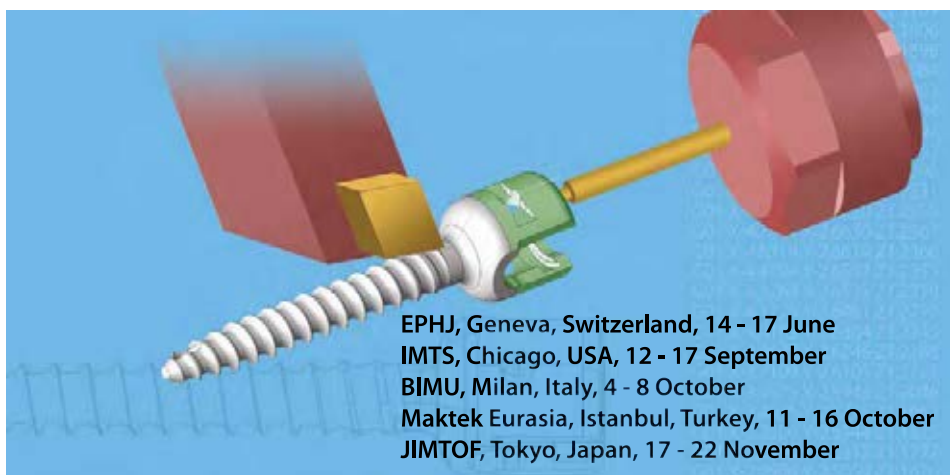


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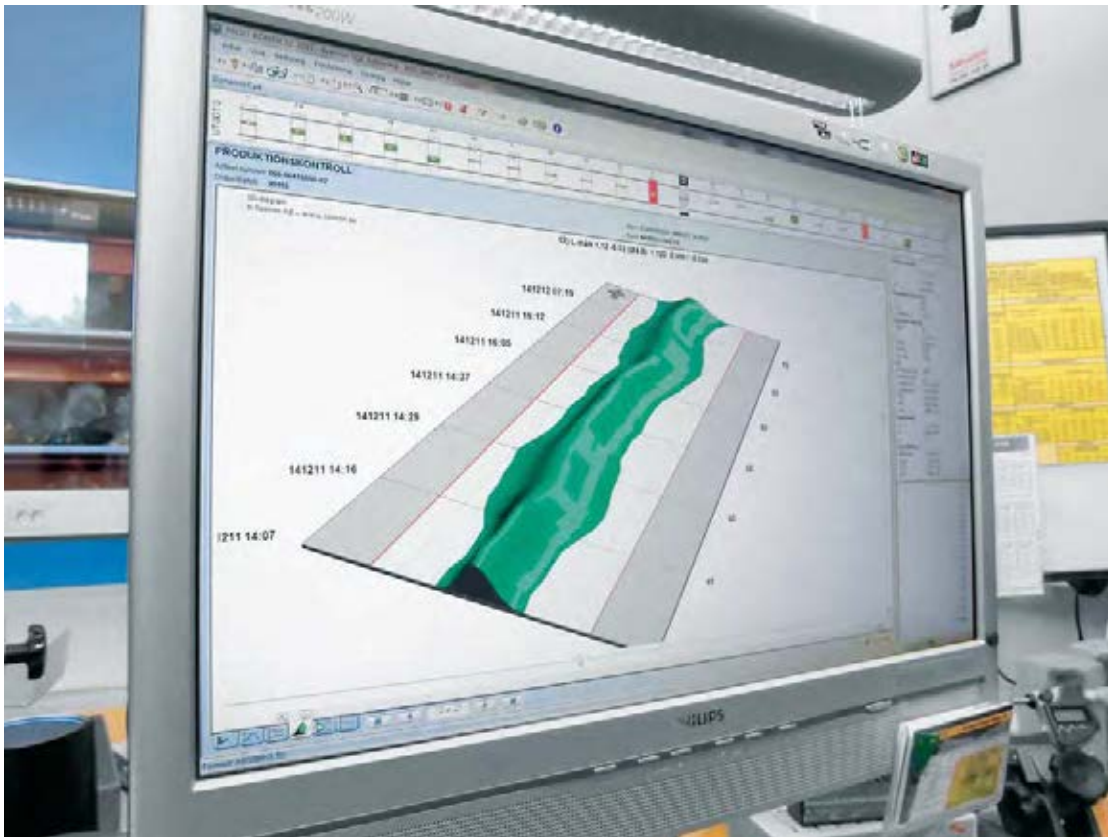


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CULT OF PRECISION IN TÄBY

Among Sweden's long-established metal machining operations, Hallberg-Sekrom AB may well be the most successful of all. Based in Täby near Stockholm in southern Sweden, the company has roots dating back to the 1920s. Its relationship with Motorex goes back "only" to 1998. Still successful today, the collaboration began with a major challenge...



Hallberg-Sekrom's quality assurance pros rely on the proven SPC (statistical process control) method. On screen is the deviation from the mean shown in green between the red lines indicating tolerance limits.

Hallberg-Sekrom is a member of Sweden's HSF Group, one of the leading suppliers of turned and milled parts in Scandinavia. It supplies precision aluminum, cast aluminum, steel, cast steel, stainless steel, brass, copper and plastic parts. Whether it involves manufacturing a single part or a million-piece run, each order is carried out with the utmost technical expertise and the essential know-how. Depending on the circumstances, the group makes use of three production sites in Sweden, Estonia, and even one as far as China. The plant in Täby, Sweden currently produces parts ranging from 2 to 65 mm in diameter for the automotive, manu-

facturing, telecommunications, medical device and defense industries. Motorex and Tornos have been in partnership with Hallberg-Sekrom for many years.

Proof of capabilities, 1998

Ehn&Land AB of Nacka Strand has been importing and representing Motorex Swissline industrial lubricants in Sweden since 1998. The company has an outstanding reputation throughout Sweden as a specialist in machine tools, providing a variety of services for the metalworking industry. In 1998 Hallberg-Sekrom's production manager called

Presentation



"With Motorex machining fluids and impeccable support from Ehn&Land, we know we've got two capable partners at our side."

*Peter Jansson,
Hallberg-Sekrom AB
production manager,
Täby*

Ehn&Land's technical customer service department when problems arose in producing a medical device part out of 1.4441 implant steel. The tool was wearing out after just a few pieces and the result of the machining process was unsatisfactory. When on-site analysis revealed that the cutting oil then being used was not up to the job (as indicated by color, odor and the shape of the chips), a Motorex product was chosen to replace it, the then-current Motorex Inox 300. With the switch an efficient production process was quickly set up and the customer was able to meet its commitments within the deadline. And with that Ehn&Land found itself supplying not only machines, but also the Motorex cutting fluids that had become a key success factor for the company.

An eclectic machine pool and a variety of materials

As one of Sweden's oldest producers of turned parts, Hallberg-Sekrom has some 50 machine tools in operation in Täby. As is often the case, these machines represent a wide range of generations. Large runs of relatively simple parts are still produced with precision and extreme efficiency on cam-controlled machines from the 1960s. Directly adjacent are CNC-controlled machining centers configured for production of complex parts. The machine pool that has gathered over the years is an eclectic one. The variety of applications and materials in use required a range of cutting oils and emulsions. Users throughout Sweden were calling for a universal machining fluid and the simplified handling and logistics it would make possible, and Hallberg-Sekrom was no exception.

Universal machining fluids

These days performance, process reliability and economy are key factors in choosing a machining fluid. Motorex, at its corporate headquarters in Langenthal, has ultramodern laboratories staffed by specialist chemists and engineers. The company's successful products are a reflection of ongoing investment in research and development together with decades of close collaboration with renowned machine and tool manufacturers. Universal machining fluids such as Motorex Swisscut Ortho cutting oils and Swisscool Magnum emulsions are especially popular among international users. At



Under one roof: The air-conditioned production plant houses some 50 machine tools of different generations. Only two machining fluids are needed for the full range of production processes.



Motorex Ortho NF-X 15 cutting oil is used in a wide range of machines. It has the essential performance reserves for even the most challenging applications.



Hallberg-Sekrom's breadth of production is impressive. Its customers include successful global enterprises such as Atlas Copco.



Quality control is a time-consuming but crucial step on the way to perfect end results. Many of the testing methods Hallberg-Sekrom employs were specified in collaboration with the customer.

Hallberg-Sekrom AB, Ortho NF-X 15 cutting oil and water-miscible Magnum UX 400 coolant-lubricant cover the entire, extremely broad range of machining processes.

High process precision with SPC

Hallberg-Sekrom has long adhered to the principle of reaching the specified production results by the most direct possible path. This tenet led the company to become an early adopter of the proven SPC (statistical process control) method. SPC involves organizing production procedures to optimize production and service processes using statistical methods. Mean values (see large image) and maximum deviation tolerances (red lines) are defined for each workpiece and continuously monitored throughout the production process. This yields a certain degree of transparency in identifying potential deviations from the target dimensions, such as

1. variation due to general causes (random deviations from the mean)
2. variation due to specific causes (e.g. defects in the material, machine or tool)

Over time, the IT-supported SPC system has been steadily modified to meet current needs. Together with extremely precise measuring equipment, the result is that sources of defects in daily production are very rapidly eliminated.

The goal: 100% customer satisfaction

Continuous process improvement, rigorous quality control using state-of-the-art measuring devices and collaboration with capable partners are ideal ingredients in ensuring 100% customer satisfaction. At Hallberg-Sekrom, these technological success factors have their counterpart in human factors — the company's 35 employees have long since become a well-rehearsed team.

We're always happy to provide information on Ortho cutting oils and Magnum coolant-lubricants and their impact on process capability:



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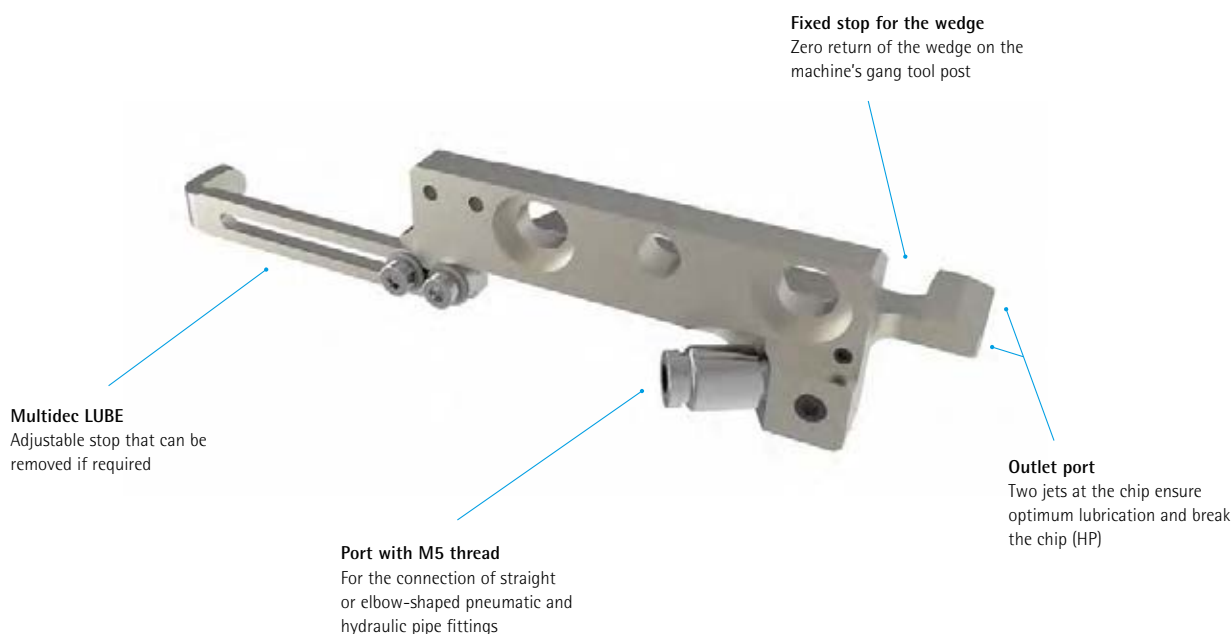
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THE MULTIDEC LUBE SYSTEM BY UTILIS SUPPLIES COOLANT DIRECT
TO THE CUTTING EDGE

INTEGRATED LUBRICATION FOR THE TORNOS SWISS GT 26

Manufacturers are always looking for the optimum solution to supply coolant as close as possible to the cutting edge of their tools. Now, a system that ensures precise coolant supply to the spot where the chips are generated is now available.



Multidec LUBE – a revolution that unites clamping and coolant supply functions

There are many solutions already available and tested to meet market requirements but, on the whole, very few can achieve satisfying results. Tools with integrated coolant supply are a good alternative, but this solution imposes a proprietary system from a cutting tool manufacturer.

The Multidec LUBE system unites precise coolant supply and tool clamping to offer a universal solution without major investment. It actually allows the use of standard tool holders that machine tool users already abundantly have in store. Therefore manufacturers do not have to buy new and often very

expensive tool holders with integrated coolant supply; and neither do they have to change to a tooling system from a specific manufacturer.

Reduction of coolant volume

Studies show that approximately only 20% of the oil transported through the large number of coolant lines are genuinely delivered to the working area of a machine, meaning 80% remains unused. In the case of a standard pump, the flow rate amounts to approx 5 to 10 liters per minute and the cutting oil tank of a medium-sized machine tool has a capacity of about 200 liters. The calculation is simple: theoretically, during one day with a production time



of 10 hours, the oil is used more than 20 times in the machining area. The main negative side effects are oxidation and premature ageing of the coolant, as well as an objectionable accumulation of metal particles in the filtration system. Targeting the precise distribution of the cutting oil, Multidec LUBE substantially reduces the oil volume required in the working area and it contributes to the extension of the cutting tool life thanks to its high-precision oil jets.

Lubrication example <10 bars

The lubricating pumps are usually offered as basic machine equipment and don't often reach a pressure higher than 5 or 10 bar. This comparatively low pressure is not able to cut through the chip; at the very most, it can give the chip an impetus to carry it along and remove it from the cutting and clamping areas. However, tests have shown that even a low pressure force can promote a tool life extension by approximately 18 to 22%, provided it is combined with high precision jet delivery.

High-pressure pump

To fully utilise the advantages of the Multidec LUBE system, it is recommended to use a high-pressure pump. Not only do such pumps offer perfect lubrication of the cutting edge, but the high-pressure jet strikes the chip with a strong impact and breaks it, and then washes it out of the machining area. Moreover, the high pressure reduces the potential risk of the sticking effect or built-up edge formation on the cutting edge of the tool. The closer the jet outlet is located to the cutting area, the more the pressure is increased and the more the jet shape remains homogenous. The diameter of the nozzle is equally important as the pump pressure. The smaller the nozzle diameter, the higher the pressure in the circuit and the higher the flow rate. With Multidec

LUBE, troubles such as chips wound around the workpiece, breakage of small tools caused by this or even chips hindering the counter spindle from correctly clamping the workpiece.

Importance of appropriate viscosity and filtration

These two aspects are of fundamental importance for proper oil circulation in the piping system. A low viscosity allows the unrestricted flow through small-diameter line sections located between the main part to be supplied with oil, the high-pressure pipe and the pipes of the clamping wedge. If Multidec IC tools, tools with integrated coolant supply or Multidec LUBE clamping wedges are used, fine filtration is required to prevent any obstruction of the pipes and to enable perfect oil circulation.



MULTIDEC LUBE FOR TORNOS SWISS GT 26

- Two high-precision jets
- Adjustable stop for the tool holder
- Double stop for tool set-up
- Calibration on bar diameter no longer necessary
- Suitable for high or low pressure
- Installation of pneumatic or hydraulic pipe fittings
- Very high stability and rigidity
- Extraction screw just as on the original wedge
- Easy installation on the original gang tool post without any modification
- Possibility to use standard tools of all brands

Customized for Tornos Swiss GT 26

A Tornos Swiss GT 26 machine is equipped with two gang tool posts – left-hand and right-hand gang tool post. Each differs in the tool protrusion length. This special feature implicates the need to produce two wedge types that have a different distance between the screw hole at the front side and the actual stop of the wedge. The available range for the Swiss GT 26 machine comprises three wedge types (see the opposite box). The wedges with coolant supply function are provided with two ports with M5 thread, one on the wedge face and the other one on its side. Via an easy and space saving access, low-pressure or high-pressure pipe fittings for up to 200 bar can be connected.

The Multidec LUBE range also comprises a lubrication-free wedge that actually serves for tool repositioning. Like for the rest of the range, tool calibration is carried out only once; a repeatability with a tolerance of ± 0.02 mm is then guaranteed for the installation and removal of the tool holder on the machine's gang tool post.

Gang tool posts of Tornos Swiss GT 26

The left-hand gang tool post (ref. 386209) accommodates five tools with upward chip formation and the right-hand gang tool post (ref. 386210) accommodates four tools with downward chip formation and cut-off tool in the lowest station. This example shows a low-pressure type with a maximum pressure of <30 bar. A manifold on each gang tool post ensures the correct distribution of the coolant to the clamping wedges that are actually used for clamping. Wedges that are not fed with coolant are lubrication-free wedges that are used for set-up purposes. In the case of a hydraulic installation type, pipes and pipe fittings do not require additional space.



Wedge with coolant supply function

Multidec LUBE clamping wedge – view of the wedge stop and of the two joint ports for optimum coolant supply.

High-precision jet with 100 bar

Minimum space requirement for pipe fittings and hydraulic piping.

Available wedges

Three wedge types are now available.

For the left-hand gang tool post (ref. 386209)

- MLU TO-04 R-R IC F wedge with coolant supply function
- MLU TO 02 SE set-up wedge

For the right-hand gang tool post (ref. 386210)

- MLU TO 03 R-R IC F wedge with coolant supply function
- MLU TO 01 SE set-up wedge
- MLU TO 02 R-R IC F for cut-off purposes



Set-up wedge

Clamping wedge Multidec SETTING without lubrication function but – just as the other wedges – equipped with a repositioning stop that suppresses the calibration of the tool after it has been removed.

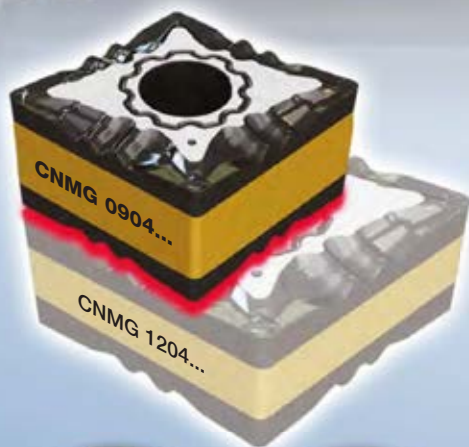
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MASTERCAM, A SOFTWARE TOOL FAMILY TAILORED TO THE ACTUAL MARKET NEEDS AND TO THE CHALLENGES OF THE FUTURE

This year, Mastercam is going to expand its CAM software family in co-operation with Tornos to offer the TISIS users integrated CAM features. In view of higher productivity, other innovations are also offered. These will include new algorithms for 5-axis simultaneous machining specifically for bar turning, software to simplify the creation of complex machining programs, advanced management of modular machines and a new multi-view simulation function.

Mastercam: more than 30 years of experience in machining with a global network of skills

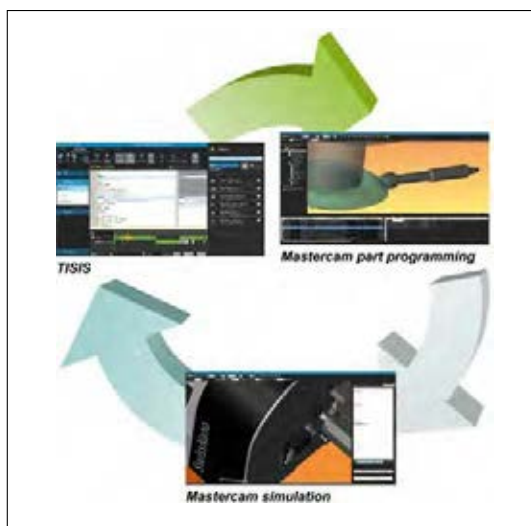
For 21 years, Mastercam has been a leading CAM solution with more than 500 dealers in over 75 countries. Mastercam's huge success can also be traced back to the good match between the dealers skills and the customer requirements. It is already 5 years since a Competence Center was built in Switzerland with the view of supporting the important market and also creating further technological developments with Swiss-type lathes.

In particular, the Mastercam family comprises:

- Mastercam Design (3D CAD)
- Mastercam Mill (milling)
- Mastercam Lathe (turning)
- Mastercam Wire (wire EDM)
- Mastercam Swiss (bar turning).

Let's recall some of the strong points of the Mastercam Swiss:

- realistic simulation of the tool path
- automatic interference and tool path deviation control
- unlimited number of axes and channels
- machine-type specific synchronisation and restriction management
- management of the machining processes with various types of tool holders and bar-turning specific operations
- capability of 5-axis simultaneous machining
- automatic creation of high-precision programs in ISO, TB-Deco (PNC or PTO) and TISIS.



In 2016, the Mastercam family is going to be enlarged in partnership with Tornos

Tornos has chosen the Mastercam product to provide the users of its TISIS software with advanced ISO programming functions: *"The responsiveness of a local development team specialising in bar turning, the adaption capabilities, the ultra-realistic programming concept and the possibility to control all models of our entire range of machines with the Mastercam product induced us to decide in favor of the Mastercam CNC software company to jointly develop CAM features especially for TISIS."* Patrick Neuenschwander Software & Electrical Manager at Tornos

A Mastercam version tailored to the specific demands of the Tornos machine range will offer CAM features to the TISIS users – via an interface that was specifically designed for the two software types. The launch of the first version of the Mastercam software for Tornos is expected to be released in the second quarter of 2016.

Simplified creation of complex machining programs through a 3D environment

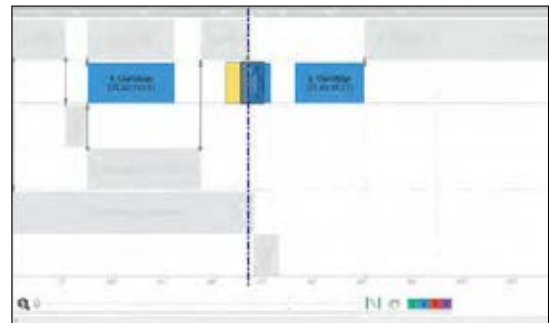
Thanks to the new features of Mastercam Swiss, the operators of Swiss-type lathes will enjoy an easier life, both with complex and simultaneous machining processes.

In consideration of the fact that operators of Swiss-type lathes often hesitate to execute several operations simultaneously, sometimes for technical reasons but also due to the existence of an interference risk; Mastercam Swiss primarily focuses on the management of simultaneous turning and milling operations and offers a realistic machine simulation in 3D.

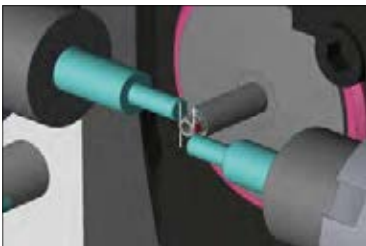
Importance is also attached to the support of long parts with the counter-spindle. In this working mode, the axes are synchronized in a master/slave configuration and the simulation enables the operations that are subject to the risk of interference to be displayed before they are actually performed on the machine.



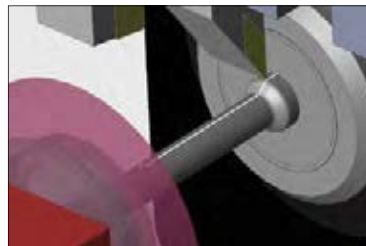
Gantt chart with clear breakdown.



Shift of an operation directly in the Gantt chart.



Parallel milling at the 2 gang tool posts of an EvoDeco 16 machine.



Example of a long workpiece being supported by the counter-spindle.



Modification of the common parameters in various operations.

Enhanced productivity thanks to a new synchronization system

While the characteristic feature of Swiss-type lathes is to machine with simultaneous processes, Mastercam Swiss provides an efficient and simple tool to manage synchronisation. In the new version, special emphasis has been placed on the addition of various functions to the Gantt chart, notably:

- better readability of each operation
- shift of an operation and re-calculation of the range
- selection of a group of operations and modification of the common parameters
- optimised graphic space for the creation of synchronizations
- time-based display or display with fixed operation scale.

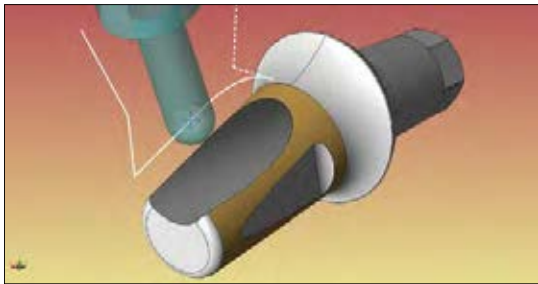
New algorithms for 5-axis simultaneous machining especially for bar turning

The software must be ready to control any type of Swiss-type lathe. Mastercam Swiss stays abreast of this evolution by continued integration with the 5-axis algorithms of Mastercam. The latter are not just used as they are but specifically adapted to Swiss-type lathes.

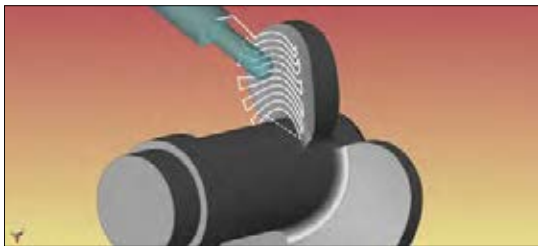
This Mastercam Swiss version for 5-axis simultaneous control allows the use of the following algorithms:

- parallel operations
- shape between 2 surfaces
- line parallel to the surface
- shape between 2 curves
- projection of curves.

These functions have an option to limit the B-axis, the C-axis or both of them and thus allow the use of these machining options on Swiss-type lathes with limited management as regards to the number of axes to be controlled simultaneously per block.



5-axis simultaneous machining: projection of curves.



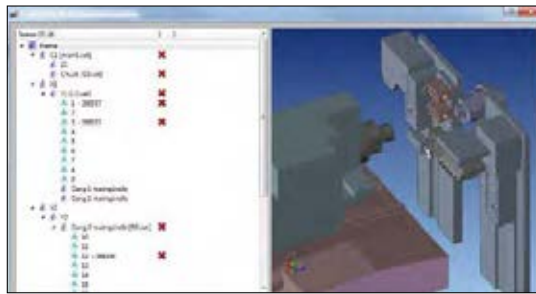
5-axis simultaneous machining: shape between 2 surfaces.

Advanced management of modular machines (machine configuration)

The manufacturers of Swiss-type lathes increasingly tend to design modular machines such as the Tornos GT 26. With the customisation of the machine environment in mind, this kind of management has been reviewed in Mastercam Swiss. From now on, the user can configure his modular machine while taking the restrictions regarding the arrangement of the available elements into account.

In the "machine configuration" window, the operator of the Swiss-type lathe will find various tool holders available for his machine and a list of the positions available for each holder on the machine. He can thus move the different elements to other positions using the drag-and-drop function. The tool elements that must use several positions on the machine are managed just as the conditions that are required for their positioning (drive, space required, etc.).

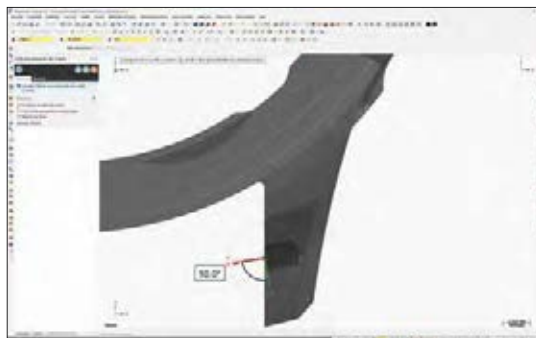
A special graphic window will be provided for a 3D view of the machine with the tool holders used on it. The user can save his own machine configurations and use them for any workpieces that require the same tooling.



Management example for users of modular machines.

Mastercam Swiss, Mastercam Design and bridging to other CAD systems

Mastercam Design is a powerful design software based on direct modeling without parameters. It has numerous standard interfaces or interfaces for native file format. Between Mastercam Swiss and Mastercam Design, the machining process can be updated automatically.



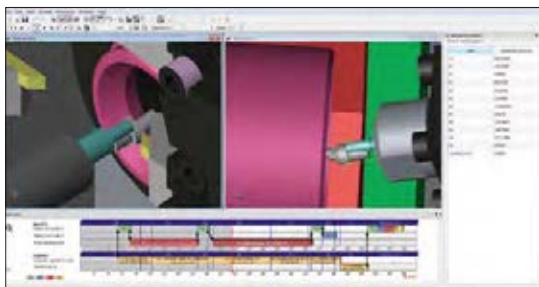
Simplified modification of the inclination for drilling on the 3D model with Mastercam Design.

This feature specifically designed for Mastercam Design can also be used with other CAD systems.

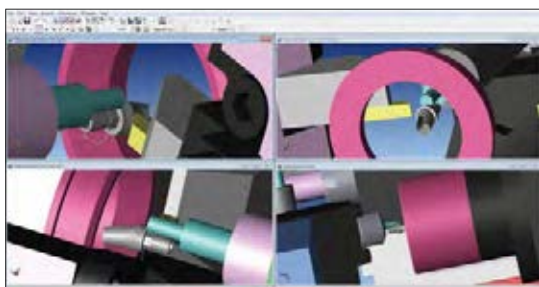
Multi-view simulation

The ultra-realistic simulation has always been a strong point of Mastercam Swiss. In trying to permanently provide the users with new possibilities, multi-view simulation management is offered.

This function e.g. allows the visualization of the machining process on the main spindle side in one view while the back machining process is shown in another view; the display is possible from various viewing angles and in independent zoom views. It is also possible for the operator to create an unlimited number of views of his machine for simulation purposes and thus to monitor the spindles and each tool group. This function may also be used for the simulation on multi-spindle machines.



Multi-view simulation.



4-view simulation also provided for multi-spindle machines.

Training, customization and assistance – the strong points for the introduction of a CAD/CAM system

The high-quality service offered by the local dealers guarantees a high ease of use of the solution, even for operators who have not been trained on CAD/CAM software tools. When selecting the appropriate solution, a benchmark actually enables optimum customization. Once the customer has decided to buy the software, the following three stages are decisive to gain maximum benefit from the new solution:

First stage: implementation

Specific training is provided on the customer's premises or at the Mastercam training center where the specific needs will be identified in the course of demonstrations.

The training is tailored to the customer's machine, in due consideration of the workpieces to be machined and of the cutting tools to be used. The user will then have at his disposal machining range patterns, a directory of the tools appropriate for his production and programs ready-to-copy for future machining tasks.

This "turnkey" solution has proved to be successful and has yielded excellent results.

Second stage: "customized" post-processors

Each company has its own expertise that is based on its specific type of production. Its secrets of success are used as a basis for the customization of the

post-processors, i.e. machine operation will take place with the right NC codes, at the proper position and without manual intervention. Mastercam Swiss 2015 has been significantly modified to make future updates more dynamic, faster and simpler.

Third stage: after-sales service

It is important for the customer to get prompt help in case of need and to get information on innovations and software updates. With Mastercam Swiss, this service provided under a maintenance contract comprises several tasks:

- hotline service by telephone or e-mail with remote diagnosis and control
- regular webinars in which innovations, tips and tricks are announced
- sub-contracting service for the realization of programs for customers in case of an occasional lack of resources.

With these three stages, Mastercam Swiss can be successfully introduced in any company that has not worked with CAM systems so far.

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Type / Typ CNC

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

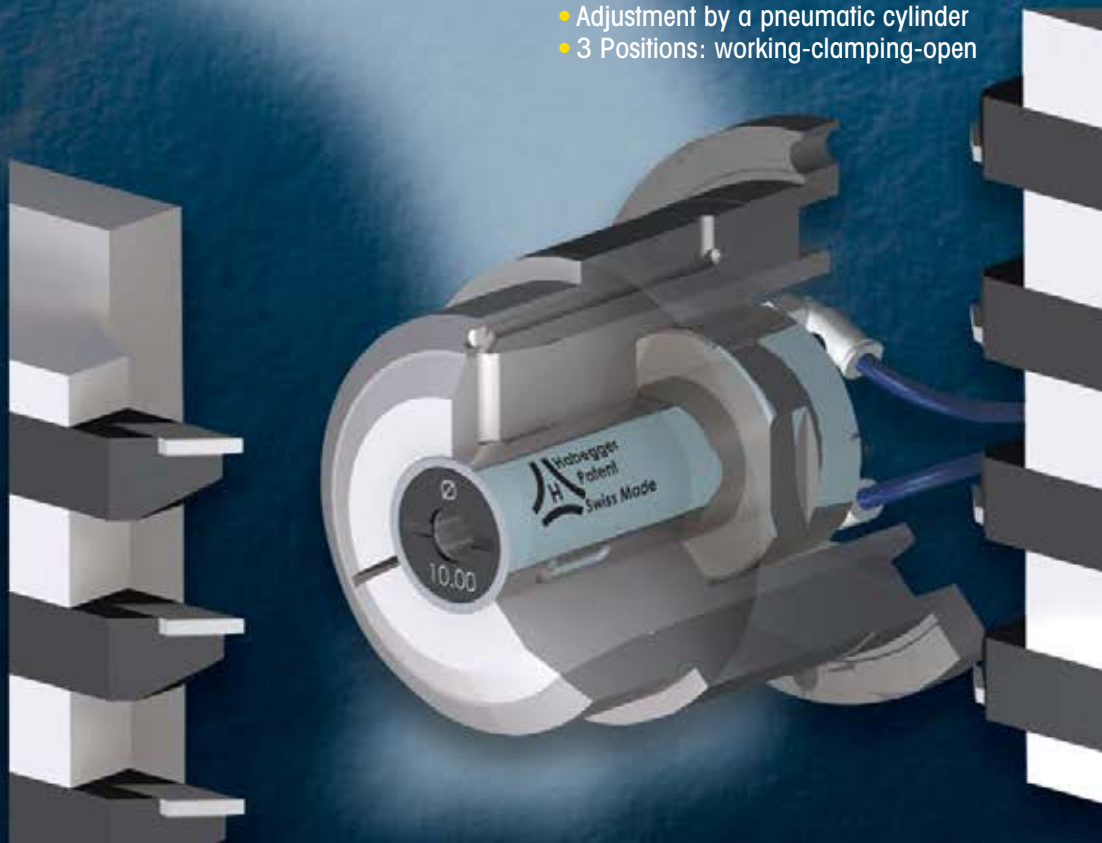


Type / Typ C

- 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!
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ONGOING INNOVATION

At SIAMS 2014, Applitec showcased its new IN-Line Series, a series of tool holders and boring bars developed and manufactured in Moutier, Switzerland.



IN-Line

IN-Line series

Since then, the product has proven its merits especially with its first BH-type tool holder with a keyless clamping nut that is located as close as possible to the cutting edge. This system developed by Applitec is widely recognized in the market. With its high precision and rigidity, it tackles the problem of vibrations that often occur during ID machining. Tool life is therefore significantly increased.

In due consideration of the requirements of its customers and partners and taking the market demands into account, the engineers of the Applitec team have effectively broadened the IN-Line series by developing new tool holders and boring bars such as:

- BH-type tool holders with 4 flats, dia. up to 28 mm
- BHS-type tool holders with no nut and external coolant supply and / or through-the-tool coolant supply
- BHY-type hydraulic tool holders
- BHK-type hook tool holders
- Boring bars with a minimum dia. of 0.30 mm and boring bars without through-the-tool coolant supply

This selection only names a few of the new products that complete the IN-Line 2016 series.

All boring bars are compatible with the four offered tool holder types (BH/BHS/BHY/BHK).

ZXB – 760 series

After the huge success of the ZX and ZXT geometries, the engineers at Applitec have continued to focus on perfect chip control. The new ZXB geometry, which was invented in the company's laboratories and has been tested under optimum conditions, will complement the geometries with its chip breaker. Among others, the ZXB concept allows three-directional machining just as the ZXT does.

The ZXB stands out for its low cutting force that enables higher cutting feed rates. Patrick Hirschi, Applitec expert explains: *"It goes without saying that the new ZXB insert with its clamping system with 2 screws and shifted teeth patented by Applitec is a veritable jewel that perfectly complements the well-known large TOP-Line 700 Series that is used throughout the world."*



WILL BE SHOWN AT SIAMS

The Applitec sales team confirms that these IN-Line innovations are just a few of the newly developed products that will be presented on the Applitec booth (C11 Halle 1.2) during the next SIAMS fair in Moutier (from April 19th to 22nd, 2016). Moreover, a new comprehensive booklet that replaces the current IN and ADDITIONAL brochures will be issued at this major event.

If you are interested in visiting SIAMS, you may download your free admission ticket on the SIAMS website at: www.siams.ch/ticket.



According to the Applitec engineers, the development of a chip roller geometry with a sharpened indexable insert that handles difficult-to machine materials in a series that has been designed for high rigidity – such as the TOP-LINE series – allows a net improvement of the machining performance.

This new insert with TiAlN coating is available from stock.

For further information, please contact:

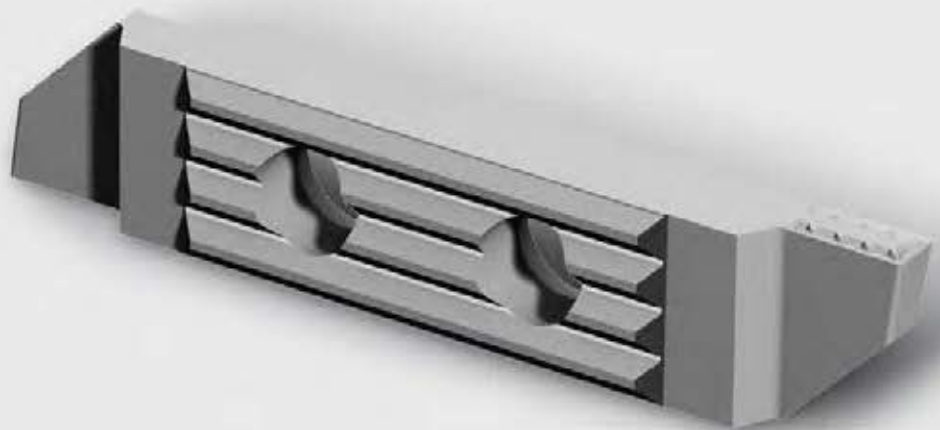
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