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"Whatever your needs, we have the appropriate solution"

Philippe Charles Head of Product Management Swiss-type/Market Segment Manager Medtec

A comprehensive and modular machine line-up

Philippe Charles Head of Product Management
Swiss-type/Market Segment Manager Medtec

"Whatever your needs, we have the appropriate solution" – this statement may sound a bit trite and appears to come from a marketing manual. However, I have been using it regularly for several months now.

And what's the reason for it? Our machine range is extremely comprehensive and is characterized by a modular tooling concept. Today, we are able to offer a unique range of solutions for the various market segments such as the micromechanics, medical and electronics industries as well as the sub-contracting sector.

Our solutions range from the CT 20 machine, a sturdy and powerful 5-axis Swiss-type lathe offered at an attractive price, to the famous EvoDeco machines featuring 10 linear axes. In between, we offer the Swiss DT and Swiss GT machines, the latter designed for diameters ranging from 13 mm to 25.4 mm or even to 32 mm in case of the Swiss GT 32 model. Each of these machines is provided with modular tool zones that enable them to be equipped with all types of tool holders and attachments.

In the last edition of our decomagazine, for instance, we presented the new gear hobbing module for Swiss DT 13, but this is just one of a whole series of options. Incidentally, we will offer a gear hobbing module for Swiss DT 26 before long. Moreover, the tool holders of the Swiss DT model can also be used on the Swiss GT machines and this provides the workshops with a high and most welcome flexibility. Both the Swiss GT 26 and Swiss GT 32 machines can be equipped with an extremely rigid B axis that also features a modular concept. With this option, the machines are pushing the machining limits further.

The EvoDeco machines are the top models of the Tornos product line-up. They are the result of more than 20 years of improvement and are still the most productive machines in the market. Over the past twenty years, as many as 10,000 Deco and EvoDeco machines have been delivered. We are properly celebrating their anniversary with our special offer under the slogan "time to turn" that can be found on our website tornos.com.

I might continue this text endlessly given our extensive range of solutions, however, the easiest way is to invite you to contact us in order to discover them yourself.

Tornos' CEO Michael Hauser (right) at the ceremonial hand-over of the 200th MultiSwiss to Herbert Maurer, plant manager of Berger Feintechnik, in Ummendorf.

Handover of the 200th MultiSwiss to Berger Feintechnik

A success story
second to none

The rise of the Berger Company to become one of the world's largest enterprises in the field of high-precision turning is closely related to the company Tornos. Both share extremely high quality standards, and Berger is constantly investing in state-of-the-art technology to be able to produce turned parts with maximum quality at reasonable cost. Against this backdrop, it is no surprise that the 200th MultiSwiss could be delivered to the Berger plant in Ummendorf, Germany.

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Over the 60 years of its existence, the company that was founded in 1955 by Alois Berger under the name 'Alois Berger Schrauben und Facondrehteile' has developed into a global group of companies with almost 2,400 employees and twelve production sites around the world. Today, Berger supplies renowned companies around the globe with complex turned, milled and ground parts of high precision with diameters between 2 and 1,800 mm and a length up to 3m as well as with ready-to-install assemblies. Based on comprehensive know-how, flexibility and commitment, the Berger group has gained international reputation for being a 'precision expert', especially in the automobile industry.

Every major car manufacturer is a Berger customer, be it directly or indirectly. Day in, day out, millions of highly complex turned parts made of various metals prove their worth, e.g. in diesel fuel injectors, ABS and ARS systems, carburetors or valves. The Berger Holding sees potential new markets especially in the

fields of camshaft phasing and direct fuel injection. With this in mind, the Ummendorf site has been significantly expanded. 5,000 square meters of floor space has been added to a base area of 5,000 square meters. The new, ultra-advanced plant was opened in 2015 and now has a floor space of 12,000 square meters. This investment is proof of Berger's foresight. Even if the company does not expect a major volume growth in Europe, it continues investing in technical development processes in Germany in order to subsequently transfer the steady processes to its plants in North America and China.

Extreme demands require extreme solutions

"Nowadays, we cannot sell capacity but only solutions," this statement by Herbert Maurer underlines the ambition of the company. In 2015, relying upon its own expertise and capability, the company applied for the supply of a leading OEM with the OEM's global demand for a key component of an advanced direct fuel injection system. The volume amounted to 16 million parts. Herbert Maurer recalls that the requirements were and are still fierce. Since the workpiece is installed directly in the combustion chamber, it is made of a high-strength material. The complex geometries have to be machined with an accuracy tolerance not exceeding 2 µm. Roger Sachse, Managing Director at Tornos Technologies Deutschland, adds: "When being asked to rate the degree of difficulty on a scale from one to ten, I would say ten plus." The contract award process took several months and comprised nearly twenty different designs. The specific challenge for the Berger team was to make the machining process suitable for series production. "Even if the production of a couple of workpieces with the required quality is ambitious, it is not too difficult," Herbert Maurer tells. "But to economically produce 16 million parts through 5-axis machining with tight test intervals, that's the real thrill."

Acid test for the system partnership

In the run-up, Berger considered various Tornos machines and other competitive products to find the appropriate manufacturing strategy. The company's target was to find the optimum start from a huge matrix. The new MultiSwiss soon turned out to be the best means of production. "At the moment, it is simply the most precise lathe and, it seemed to be the most appropriate machine to achieve stable processes," Herbert Maurer explains. Nevertheless, it took almost an entire year to get the process ready to run to the utmost satisfaction of the customer. As far as possible, the technology development took place at Berger, in close cooperation with the Tornos engineers. In the course of this project, the cooperative partnership that had developed over the previous years took full effect and series production could be started six months earlier than initially scheduled.

Instead of experimenting on a sole machine, Berger purchased ten MultiSwiss machines and has optimized the processes from the very beginning with series production in mind. "To us, it was important that the results were scalable. Already in the test phase, we have compiled a comprehensive data pool that helped us to correctly classify the effects of the individual parameters on the overall process." The ten MultiSwiss machines are now running 24/7 and fully meet the expectations of the persons in charge. The original intention was to split the volume and to have the portions produced in the plants in Germany, North America and China. But in view of the extremely positive start-up phase in Ummendorf, the capacities of the US and Chinese plants can be utilized this year.

A masterpiece of technology

With the development of the new MultiSwiss, Tornos scored a big hit and already the 200th machine of this type had been delivered. All MultiSwiss machines are equipped with independent, mobile spindles that are supported by hydrostatic bearings. The Z-axis enables

workpiece lengths to be machined that are difficult to realize on conventional multispindle lathes. At each machining position, the speed and the machining conditions can be exactly set. The operator literally 'enters the machine' and can conveniently change the tool holders without having to lean into the machine.

With its most easy access, this ergonomic working area, which is larger than on any other machine, it offers substantial economic advantages when changing the batch. Thanks to this concept, the MultiSwiss can be set up just as conveniently as a single-spindle lathe. The sole difference is the number of collets that have to be replaced. Furthermore, chip removal is outstanding. Each spindle has its own C axis. The hydrostatic bearing technology provides excellent damping characteristics that enhance surface finish and increase tool life, especially when machining tough materials. The productivity is always of utmost importance for multispindle lathes because every second counts. The torque-motor technology enables indexing times of 0.4 seconds and therefore ideally correlates with this pursuit of efficiency.

Optional equipment such as oil mist extractor, chip conveyor, fire extinguishing system and a high-pressure pump are all harmoniously embedded in the machine. This integration provides a small footprint that means a MultiSwiss machine will find its place in every workshop. Thanks to peripheral system management, the machine is extremely compact. The new Berger workshop in Ummendorf has space for further machines, so the Berger/Tornos success story can continue. On March 27th, the ceremonial hand-over of the 200th MultiSwiss machine to Herbert Maurer from Berger Feintechnik GmbH took place in the presence of Tornos' CEO Michael Hauser.

aberger.de

With its production lines in Xi'an, Tornos benefits from the industrial experience in this region.

TORNOS XI'AN: *an* ultra-advanced *production line*

In 2013, Tornos decided to expand its production capacities in Asia. The aim of this strategy was to be capable of responding to the specific needs of customers looking for entry-level and mid-range machines.

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Against this backdrop, Tornos chose Xi'an for its production site in China. To the general public, the former capital Xi'an is best known for its Terracotta Army that attracts tourists from all over the world. decomagazine wanted to know more about the new establishment and we met Arnaud Lienhart, manager of the Tornos factory in Xi'an.

decomagazine: Mister Lienhart, what led to the decision for Tornos to favour Xi'an?

Arnaud Lienhart: *We were looking for a location that was well known for its expertise. After 6 months of searching, we came to the conclusion that Xi'an was the best option. With 8 million inhabitants, Xi'an is a city the population of which has experienced a strong growth in the last few years.*
Xi'an has an impressive number of technical schools capable of providing a highly-skilled workforce.
In addition, the city is the breeding ground of the Chinese aerospace industry. Even if, in the beginning, Xi'an may not have been an obvious choice, this choice has proven to be advantageous in many respects.

dm: That means the Swiss DT 13, Swiss DT 26 and CT 20 machines are assembled in Xi'an?

AL: *Not solely. We manufacture high-quality parts. We have European machine tools that enable us to produce parts with maximum precision. The spindles*

are coming from Moutier while all other components are machined here in Xi'an. Our production capacity is based on high-quality and high-precision machines and this is our distinctive virtue. It is our goal to provide our customers with machines of excellent quality. So, we need a high-end means of production to be able to produce them. Apart from the key components that are supplied from our headquarters in Moutier, we are an entirely independent production site.

We are capable of performing specific development tasks and machining tests in our own research and development department or in our application department. In our demonstration centre, we have a machine equipped with a loading robot.

dm: How does machine assembly take place?

AL: *We work in accordance with Lean Manufacturing principles. The entire assembly process is divided up into 'steps' of one day. Once we have received the machine base, we join the machine and control cabinet and then concern ourselves with machine wiring. Afterwards, the mechanical devices are mounted on the cast-iron machine base, one after another. After various alignment and inspection processes, the enclosure is mounted.*

Then, we can go on with the next step, running-in the machine. For more than 50 hours, each machine is run-in and this is based on a run-in program that involves the operation of every axis and every motor. Subsequent to this step, a geometric inspection is carried out to ensure the machine meets the requirements. Then 50 test parts are manufactured and measured. If the machine complies with the specified requirements, it is cleaned and is then ready for shipment.

Each assembly step is completed just in time and the engineers can fully focus on their work. We have to provide impeccable quality and that's why we attach much importance to meticulous quality control. We implement the use of appropriate equipment to ensure the correct assembly of the machines. The

feeders, for instance, have been specifically designed to make sure that missing or incorrect parts are immediately detected.

In fact, every day, the components required for the assembly of each step are fed to the machine assembly zone. The tools and devices that are required at that time are available as well. The technician has exhaustive assembly instructions containing the essential issues at his disposal and the assembly can thus be completed under ideal conditions. Once this assembly step has been completed, a new pre-assembly trolley is brought to the machine. After the components have been assembled, the machine goes on to the next step (and so on until final assembly).

What's more, we have defined a boundary for supplies. Supplies cannot cross the boundary and be transferred to our stock until they have been inspected and verified. Our inspections are very meticulous; we even check the oil tanks for leaks during a 24-hour test to ensure no oil can escape. For all production sites of the Tornos production network, the same quality and safety standards as well as standards for the controlled use of resources are applied. Innovative production technologies and the high level of expertise of the Tornos staff ensure that more than 18,000 individual parts can be united into Tornos machines under optimum conditions. The required processes are rather complex and can only be executed under highly flexible structures. The two challenges posed are fully met by Tornos, be it in Switzerland, China or even Taiwan.

dm: Is it possible to visit Tornos Xi'an?

AL: *Of course! As mentioned above, we have a showroom and I would be pleased to present our production line. Do not hesitate to contact us. To get more information, you are also invited to follow us on our WeChat channel.*

tornos.com

G. & Y. Leuenberger:
a young and dynamic team!

G. & Y. LEUENBERGER SA:

entering a new dimension with MultiSwiss

In 1964, G. & Y. Leuenberger SA was established in Eschert. In October 2014, Boris Leuenberger, a young and enthusiastic engineer took over the family-owned enterprise in an economically troubled phase for Swiss companies.

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Even if the pressure is still to be felt, it has to be noted that the company has managed to respond to the situation with a significant investment, a new Tornos MultiSwiss 8x26 machine.

A family-owned enterprise

G. & Y. Leuenberger SA describes itself as a family-owned enterprise and to be competitive, Leuenberger has an extremely diverse machine inventory. Thanks to its extremely flexible structure, the company responds to orders ranging from 500 to several millions of parts with diameters from 1 and 65 mm. Materials such as brass, steel, stainless steel, titanium and even plastics can be machined. This shows the aptitude of the company to adapt to the latest product developments and even the latest trends. G. & Y. Leuenberger SA produces meticulously designed parts that are used for the manufacture of luxury-brand products.
The company focuses on 4 business areas: luxury-products, equipment industry, connector industry and watchmaking. It mainly supplies companies in Switzerland and Europe but also the United States.

Parts... and more

G. & Y. Leuenberger SA also produces customizable magnifiers for watchmakers. "This is our sole finished product," Boris Leuenberger emphasizes. Invented in 1995 by the former Managing Director

"We can now achieve surface finishes we never thought possible with a multispindle lathe."

Yves Leuenberger, the body and ring are made of aluminum, which makes the magnifier light and pleasant to wear. The range of colors and versions is virtually infinite; anodized and engraved models can be produced. They are an indispensable instrument and may prove to be a high-end giveaway for any company active in the field of high-precision engineering.

Current expansion with entry in the medical sector

This year, the company has decided to apply for ISO: 13485 certification to extend its range of activities and make its expertise available to other market segments. Boris Leuenberger is convinced that G. & Y. Leuenberger SA's production experience and its capabilities to work hand in hand with its customers will appeal to this market segment. "We are specialized in solving problems and push the machining limits of our customers further. Besides, I would like to invite companies having machining problems to contact us. We are amenable to new challenges," the Managing Director continues.

Presented for the first time at EPHJ – EPMT – SMT

Since G. & Y. Leuenberger SA is highly invested in the medical and watchmaking industries, it's not surprising that the company decided to take part in the EPHJ - EPMT - SMT fair in Geneva in 2017. These markets require in-depth technical expertise at all levels.

MultiSwiss is a machine that boasts excellent operator ergonomics.

Machine pool

- *1 Tornos MultiSwiss 8x26*
- *23 Tornos Decos and EvoDecos (10 to 32 mm)*
- *1 Tornos SAS 16*
- *15 cam driven sliding headstock machines*
- *5 milling machines, one of them being a 5-axis milling machine*
- *10 fixed-headstock machines*
- *Refinishing workshop for diameters up to 200 mm*

A strong team and comprehensive service

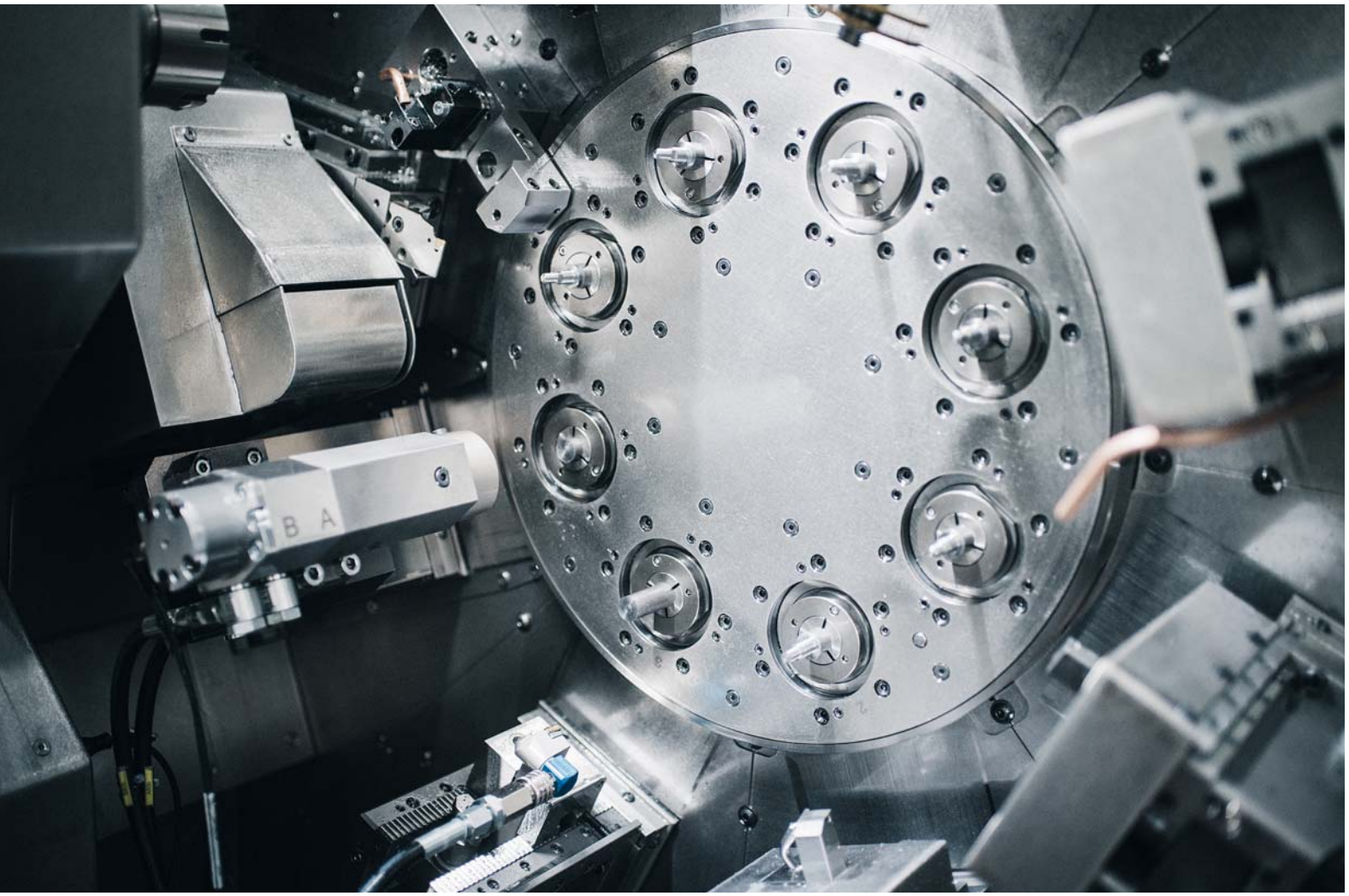
With 45 highly motivated employees, the company offers comprehensive services ranging from assembly to roller burnishing, polishing and anodizing as well as watch decoration. "Our strength is being able to free our customers from the need of subcontracting. In particular, we offer logistics solutions of all types. Upon request, we can implement Kanban stocking, consignment stocking and on call delivery." Mr. Leuenberger explains. Even packaging of the parts is realized in line with the needs and wishes of the customers.

With the aim of satisfying its customers, G. & Y. Leuenberger SA strives to respond to any type of demand. In general, projects are completed in close collaboration with the customer. "This is our preferred procedure," underlines Boris Leuenberger. "In this way, we get an idea of the customer's constraints and we can then lead them to a functional part at a reasonable price."

The constraint of cutting down lead times

How did MultiSwiss find its way into Leuenberger? The Managing Director explains: "As a Swiss company, the economic environment we are operating in is rather complex. We are competing with enterprises that are based in the Eurozone and have a different cost structure. With the abolition of the floor rate

MultiSwiss benefits from a machining area that allows optimum chip removal.

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in 2015, our prices rose by 15% overnight. We had to tackle the crisis and reinvent ourselves. We cannot afford to make errors and we have to deliver impeccable quality within shorter deadlines. All these constraints brought us to utterly rethink our strategy: we were looking for a means that enabled us to quickly respond to peaks in demand, a means to accelerate our production and a means of making us competitive."

"And that's how we came across the MultiSwiss 8x26 machine. Up to that time, our machine inventory had consisted of single-spindle machines only, apart from one SAS machine. Of course, we could face demand peaks by using several Deco or EvoDeco machines but this would often be at the cost of the production schedule. Furthermore, with its 8 spindles and its multifarious back machining functions, the MultiSwiss 8x26 unites the productivity of 5 to 8 machines on minimum floor space while producing elaborate workpieces."

A machine boasting good accessibility

Boris Leuenberger continues: "The machine is extremely user-friendly. Programming is done with the TB-Deco software that we have been familiar with for many years. It can be set up in no time and thus is not only profitable for huge series runs but is also ideal to respond to urgent demands comprising several thousands of parts. Our MultiSwiss 8x26 is our 'joker machine': it enables us to efficiently relieve our Deco machines in case of need."

And even if the machine seemed to be rather large, the Managing Director eventually recognized that it is much more compact than its competitors and does not need much more space than a single-spindle machine designed for Ø 20 mm parts with associated bar feeder. He adds: "The machine features unprecedented ergonomics: When entering the machining area, there is no need for the operator to worry about oil dripping on his head. In addition, the tool holders are easy to install and anything is close at hand. The MultiSwiss 8x26 is simply perfect."

"The machine can be set-up as quickly as a single-spindle lathe and only the replacement of the 9 collets takes a bit more time. However, the adjustment from the front makes this replacement comparatively easy and fast."

Another league

The fact that the MultiSwiss 8x26 makes multispindle technology available to the operators of single-spindle lathes certainly poses some challenges as the operator enters a new dimension. The wear of the inserts is proportional to the production and chip management is more important. However, the MultiSwiss 8x26 has surprised the experts here as well. The hydrostatic technology allows a considerable reduction of insert wear.

Mr. Leuenberger adds: "Moreover, we can now achieve surface finishes we never thought possible with a multispindle lathe." As far as chip management is concerned, the machine has a freely accessible machining area and is equipped with an outstanding chip conveyor that can efficiently discharge both long and short chips. The Managing Director summarizes: "With its low, medium and high-pressure pumps boasting a high flow rate and its large 2000-liter cutting oil tank that is heat-stabilized, the machine has the cooling capacity needed to tackle virtually all machining challenges. In short, the machine is highly accessible thanks to the technology used by Tornos."

High-quality service

The Managing Director explains that his company is located close to the Tornos headquarters which certainly facilitates any service issues. He concludes: "It should be noted that the Tornos service is simply excellent, especially regards with to the MultiSwiss 8x26. Commissioning the machine was quite easy and we feel that the technicians are fully receptive and ready to support us. They are doing an excellent job and are highly responsive if needed."

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Almac unveils its new products *in a convivial atmosphere*

On April 27th, 2017, the Swiss milling machine manufacturer Almac organized an 'After-work' event in order to present its latest innovations to visitors, in a relaxed atmosphere.

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The demonstration took place in the late afternoon and attracted a large number of interested people who were excited about the idea of getting the opportunity to discover the assembly shop, see the latest products and to swap ideas with Almac engineers.

On this occasion, Almac showed its entire range of machining centers and bar milling machines as well as one of the Tornos Swiss DT 13 Swiss-type lathes with an optional gear cutting unit. A number of machines were shown during a tour of the assembly area and this enabled the visitors to recognize the different assembly stages and become aware of the company's unrivaled expertise. Needless to say, that decomagazine attended the event to learn more about the innovations.

World debut: Almac CU 2007 with 16 tools

An entry-level machine by Almac, now that's not a common thing! The company has always been specialized in high-end applications. So, does this mean a change in strategy? "Not at all," Mathieu Jorda, Almac's Product Manager explains. He adds: "We are still active in the field of complex applications. Nevertheless, with our new CU 2007 with its 16-tool changer, we now have a new, extremely competitive platform to tackle this market segment. It will enable us to develop complex applications with a cost/performance ratio that is unequaled in the market." Almac thereby expands its portfolio to be capable of providing its customers with complete solutions.

"We can compete with the most advanced milling machines on the market. At the same time, we are capable of customizing our machines according to the specific needs of our customers," the expert explains.

With its brand-new CU 2007 equipped with a 16-tool changer, Almac offers an efficient and sturdy machining center at a very affordable price – and the customer gets a dynamic and versatile solution.

Almac CU 2007 Pick and Place – an automated system at a cost/performance ratio second to none

As Almac's flagship, this product has an integrated automation system. It comprises a workpiece magazine integrated in the machining area and it is provided with chip protection as well as a gripper system attached to the spindle block. The machine footprint has been kept to the minimum. The Pick and Place system has a very compact design and is

located at the heart of the machining area. Once the first part has been finished, the manipulator arm picks it up while the magazine opens. The workpiece is deposited in an empty position and the arm picks up the workpiece to be machined next and loads it onto the fixture. The workpiece is clamped and the magazine closes. The workpieces in the magazine are well protected and minimum loading and unloading times are achieved.

Almac CU 2007 Robot – for machining 24 hours a day

This is a unique solution that avails itself of Almac's comprehensive know-how and provides an integrated robot cell for an even higher productivity and better autonomy in the means of production. The six-axis robot can load and unload the workpieces and turn them over. An additional gripper system is used to handle the workpiece pallets. The integration of this robot provides the CU 2007 with a very high degree of autonomy in terms of movement. The loading,

A YouTube channel with the latest novelties

Mr. Jorda concludes: "The Almac BA 1008 HP machine boasts an impressive productivity level. For you to get an idea of it, you are invited to discover the Almac YouTube channel that shows very impressive sample production processes. Here, you can also discover the CU 2007 Pick and Place model and the CU 2007 machine with 16 tools."

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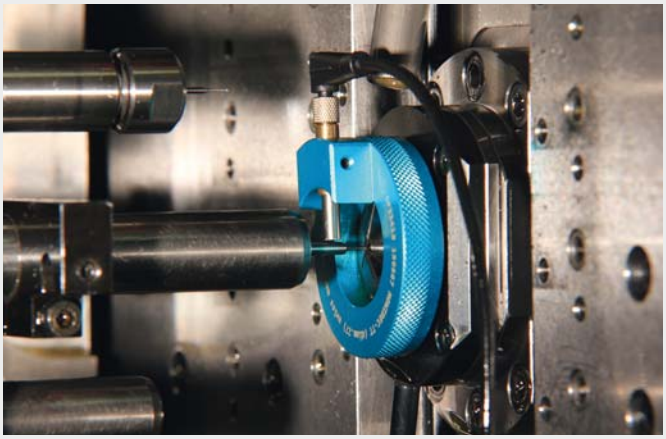

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unloading, palletizing, turn-over and reloading of the machining unit are carried out with unrivaled precision. This unit can even undertake intermediate storage and return the workpiece to its previous position. Thanks to this degree of automation, valuable time can be saved and the repeatability and precision of the parts produced can be improved since manual operations and potential sources of error are eliminated.

Almac BA 1008 HP

With the BA 1008 HP machine, Almac offers a complex means of production equipped with a central high-pressure unit that has been thoroughly integrated in the machine as well as with a sophisticated system for the recovery of precious metals. Just as the established BA 1008 machining center, the BA 1008 HP is fed with bars and equipped with 4 front spindles, 3 lateral spindles and 2 spindles for back machining.

The BA 1008 HP comprises a complete through-spindle coolant supply unit for even more precise and faster machining. As it has been specifically designed for deep-hole drilling processes, this machine is the ideal means for machining bracelet links and any other parts made of tough materials. One of the presented machine models has been exclusively equipped with a brand-new cut-off unit to increase machine productivity.

If you are interested in obtaining more detailed information, do not hesitate to contact the Almac experts via your nearest Tornos representation!

almac.ch

Counter wheel

DPRM:

High-tech and know-how *combined*

The Swiss company DPRM based in the village Arch in the vicinity of Grenchen is based in the origins of the watchmaking heartlands, crafting the most beautiful parts for the most beautiful watches.

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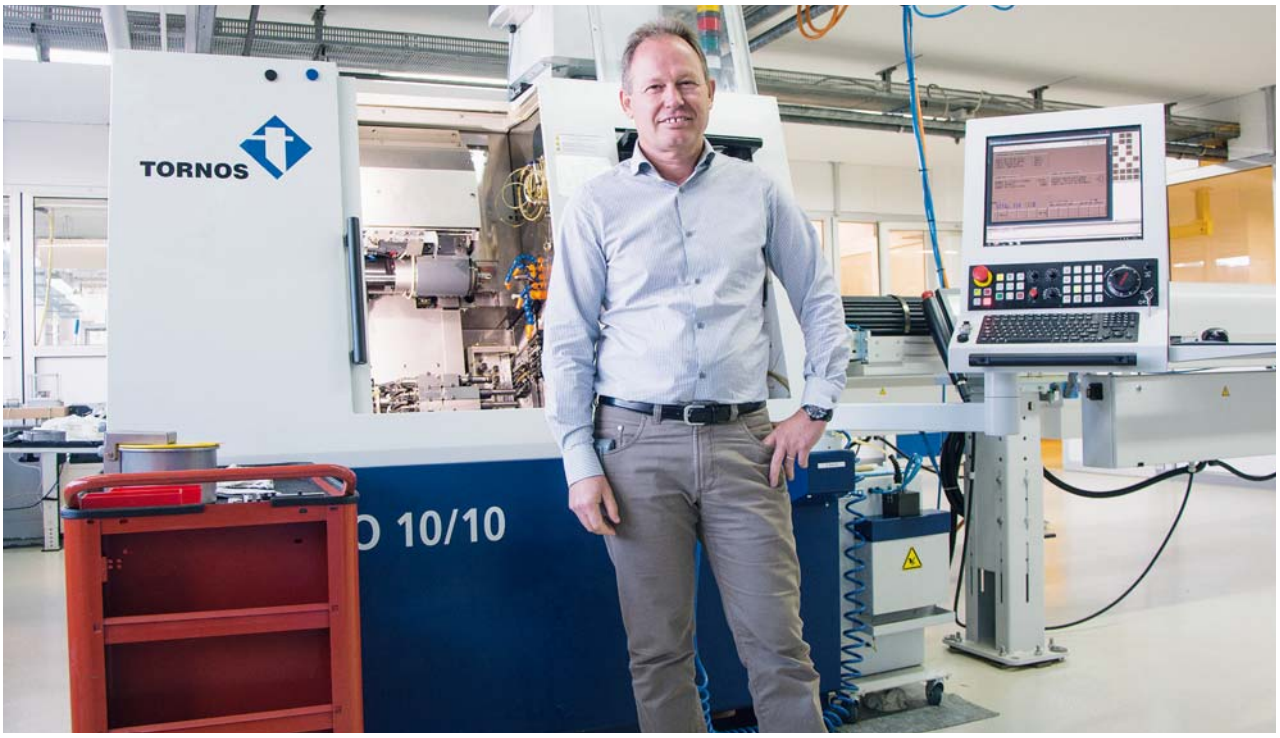
DPRM regards itself as a watch manufacturer that is mainly focused on the bar turning of micro parts. The company also performs all peripheral activities in the fields of production and quality control and even assembly. To achieve sustained success, DPRM relies on Tornos and its EvoDeco 10 and SwissNano machines for the in-house bar turning processes.

A renowned enterprise

Established in 1947 under the name 'ASKA', DPRM has been built upon a unique knowledge base that its employees have gained during the course of time. Using bar turning and gear cutting technologies, the company can develop and produce all kinds of components, meeting the requirements of the high-end watch market. Today, DPRM is a part of the Dubois Dépraz Corporation, a famous manufacturer of exceptional watch components.

High degree of specialization

DPRM specialises in the production of arbors, pinions and wheels for high-end watches by means of gear cutting. Due to its commitment for the luxury watch industry, the company is used to meeting even the most demanding challenges. "Imagine any component that may be possible to produce from barstock – you can rest assured that we are able to produce



Laurent Forster, Managing Director.

it, even if the production of the part does not involve turning operations," Mr. Forster, Managing Director of DPRM, emphasizes. "Our staff is used to successfully meeting even the most complex demands. In any case where we encounter problems, we work hand in hand with the customer to jointly find a solution. Our know-how is recognized by our customers and we are pleased to offer them our support as a co-developer for the industrialised production of even the most complex components," Mr. Forster adds.

High demands

"Tolerances in the range of 4 to 6 microns? Meeting such tolerances is part of our daily routine for nearly all of our parts, while also considering aesthetic aspects and high levels of surface finish. For instance, we can machine holes of Ø 0.3 mm with a length of 7 mm with a length that is more than 23 times the diameter! On our EvoDeco 10, we can produce prismatic parts without any turning processes,"
Mr. Forster explains. In addition to machining operations, the company offers highly complex assembly services, for instance for cannon pinions (including friction spring adjustment), third wheels, counter wheels, reversing wheels and second wheels."

Unrivaled response

These days, responsiveness is the key to success. DPRM has fully understood these market forces. This is why it has set-up a manufacturing cell for prototype production to respond quickly and efficiently to customer requests. "This unit was a great success and we have separated it deliberately from

Tornos at DPRM

There are 44 machines – 7 of them EvoDeco, 4 Delta 12 and 1 SwissNano

Technologies

- *Cam and CNC controlled bar turning of micro parts*
- *Blanking*
- *Gear cutting*
- *Burnishing*
- *Assembly*
- *Decoration*
- *Standardized high-quality service*
- *Thermal treatment*
- *Surface treatment*

"The machine is very precise and it works wonders in the production of small components where tight tolerances must be met"

the production area to have a dedicated machine inventory especially for such tasks. It was obvious from the very beginning which machines we should use for this cell. We installed two EvoDeco 10 machines. Compared to competing products in the market, these machines provide us with outstanding flexibility," Mr. Forster adds. The EvoDeco 10 machines enable DPRM to manufacture both simple and highly complex parts. Thanks to its fully modular machining area, the machine can be converted to a milling center in no time. Furthermore, these machines can be equipped with numerous high-frequency spindles. And, what's more, the machines allow gear cutting in main and back machining operations.

EvoDeco: A first-class partner

"The EvoDeco machine is our first-choice solution for the production of our components. It is the ideal machine to meet the ever growing demands on the complexity of the parts to be machined. If, for large batches, finish gear cutting is the more appropriate machining process, this machine enables gear cutting without the risk of positioning errors while at the same time, cutting down the tooling cost," explains the company's micro turning/CNC division manager.

"TB-Deco facilitates machine programming even when it comes to complex operations. The machine can be set up rapidly and the presetting device allows substantial time savings during machine set-up. The next process can be prepared while the current machining process is still active. The machine quickly reaches its operating temperature and boasts optimum thermal stability during the production process. Thanks to the warm-up system, the machine is ready for production just when desired. The self-cleaning filter brings about considerable time advantages and the oil tank is large. The capacity of the chip bucket is better than on competitive machines. All in all, the

HAROLD HABEGGER

Canons de guidage
Führungsbüchsen
Guide bushes

Type / Typ CNC

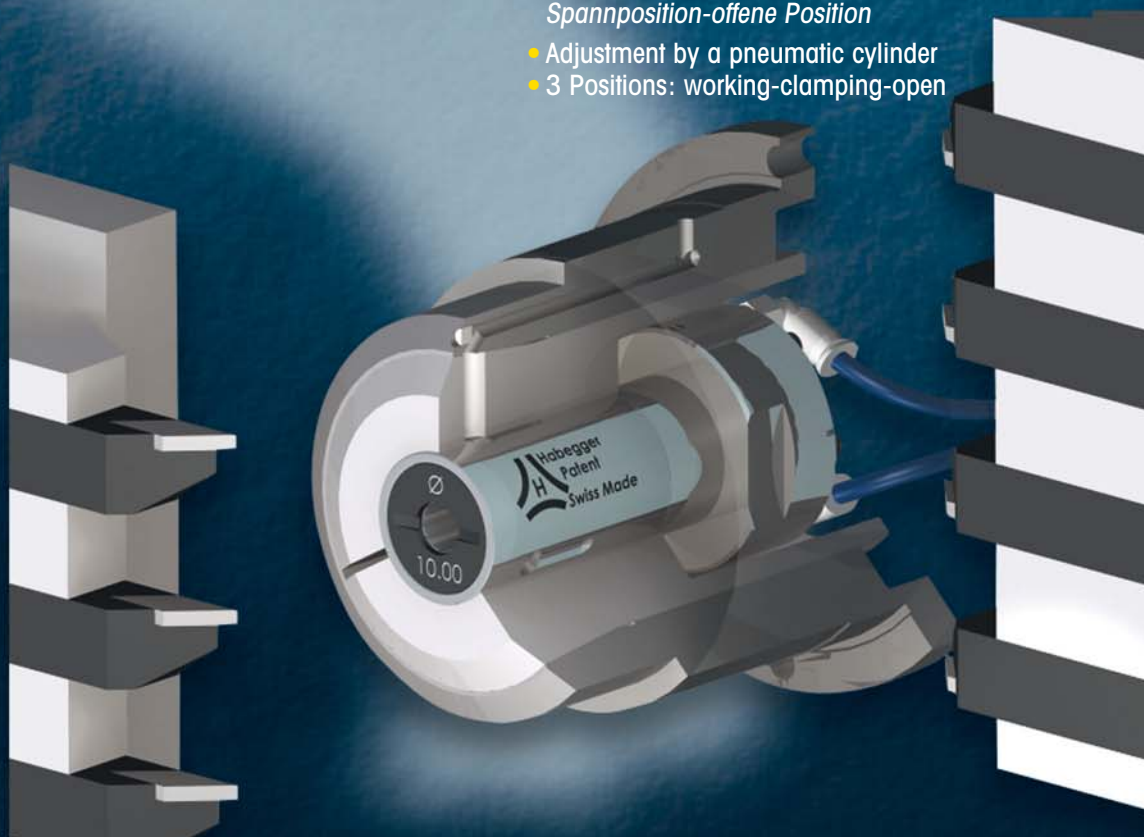
- Canon non tournant, à galets en métal dur
- Evite le grippage axial
- *Nicht drehende Führungsbüchse, mit Hartmetallrollen*
- *Vermeidet das axiale Festsitzen*
- Non revolving bush, with carbide rollers
- Avoids any axial seizing-up

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!

Harold Habegger SA
Route de Chaluet 5/9
CH - 2738 Court
www.habegger-sa.com

EvoDeco machines offer a high ease of maintenance; you can see that every detail has been conceived in a most intelligent manner with the operator in mind."

SwissNano: High speed and precision

With its ergonomic features and its easy programming, the SwissNano appealed quickly to the DPRM users as well. "It's amazing how easy it is to get familiar with this machine," stresses the CNC division manager, and he adds: "The machine is very precise and it works wonders in the production of small components where tight tolerances must be met. With its ability to machine usually less complex workpieces than with an EvoDeco machine, it perfectly matches our requirements and enables us to quickly respond to any type of request. The SwissNano can perform front machining and polygon cutting tasks to our complete satisfaction."

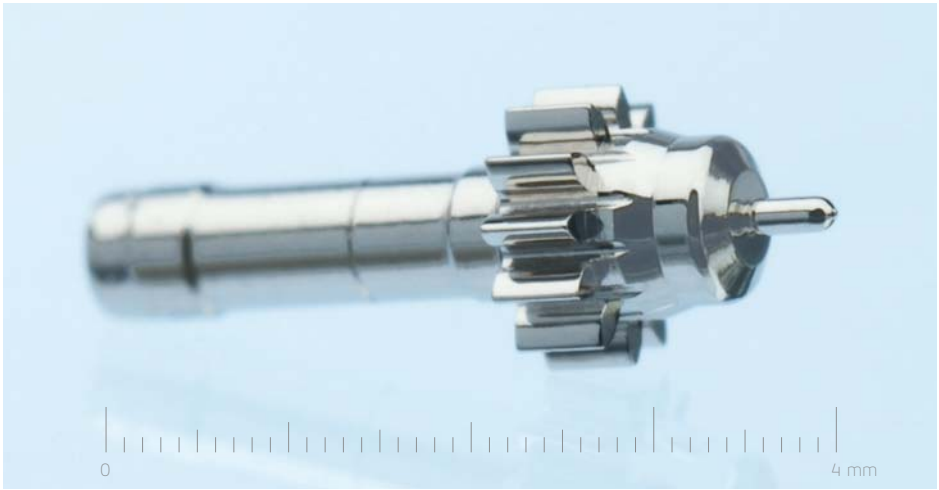
High-quality service

"The product support offered by the Tornos Service team is excellent, just as is true for its responsiveness and professionalism. We know, we will always get the best solution for our problems. Whether we have mechanical problems or problems with the software or simply with programming, we will get help from competent partners. And, what's more, excellent availability of any spare parts is guaranteed. On the whole, we are highly satisfied with the service Tornos offers for its products," the Managing Director concludes.

dprm.ch

Cannon pinion

Hour ratchet



Minute pinion

Date corrector pinion

Ways to optimise cycle times #2

In a series of articles, Tornos expert Mr Marco Dolci offers detailed information on the basics of bar turning and suggests ways to optimise cycle times on machines working with ISO-code programs. In this decomagazine edition, we'll now look at ways to improve the machining process through suitable tool indexing, approach and retraction.

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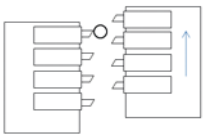
Tool indexing

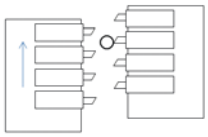
Tool indexing during the machining process

On machines with independent tooling systems (EvoDeco, SwissNano), intelligent organisation of the tools is advisable to ensure the tools can be indexed while the other system is machining the part and vice versa.

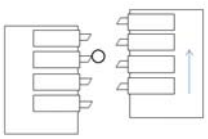
Example:



Machining with a tool from gang tool post 2.
At the same time, set-up of the next tool on gang tool post 1.



Machining with a tool on gang tool post 1.
At the same time, setting up the next tool on gang tool post 2.



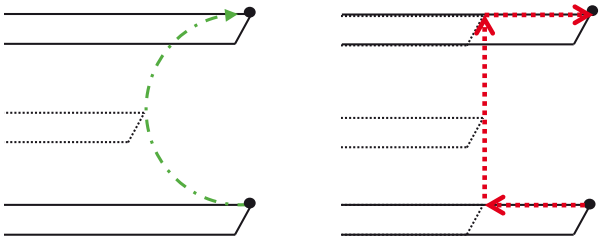
Machining with a tool on gang tool post 2.
At the same time, setting up the next tool on gang tool post 1.

It's interesting to give the rotation impetus for the driven tools from the other channel while the machining process is active.

It is possible to index the tool with circular interpolation and to define the indexing speed using parameters that ensure tool positioning is done just when the tool from the other system has completed machining. In this way, abrupt machine movements caused by tool indexing (while machining is done on the other side) can be avoided.

Example:
G903 T_ D_ F_

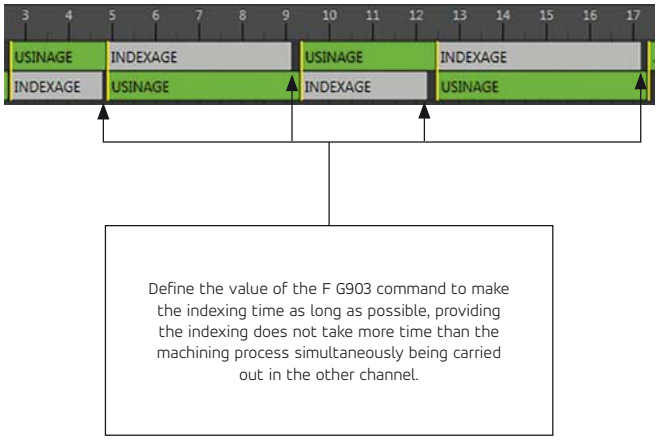
G903: *Tool indexing with circular interpolati*
T_ D_: *Number of the tool and of the desired tool offset*
F_: *Feed rate during indexing [mm/min]*



Indexing with circular interpolation

Conventional indexing

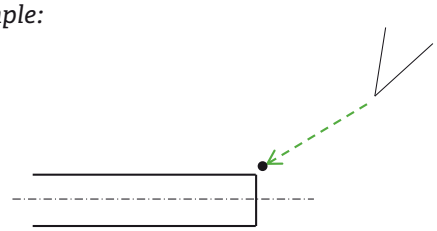
Please note that the indexing feed rate can be very easily determined based on the Gantt chart within the TISIS software. This ensures the tool reaches the correct position at the right time.



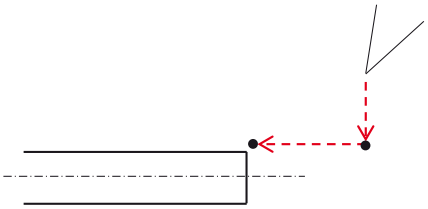
Tool approach

As far as possible, it is recommended to approach the tools at rapid traverse rate [G0] with simultaneous movement in several axes.

Example:



Time saving

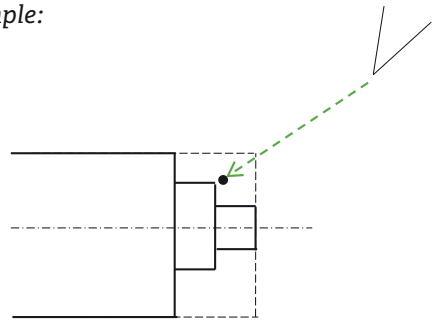


Time loss

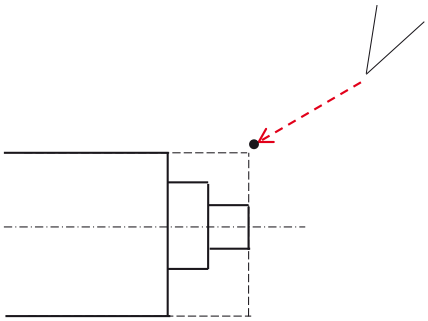
It is also possible to approach the tool simultaneously in the linear and rotary axes (e.g. Y, Z + C).

If the part to be approached by the tool has already been partly machined, the tool approach can be parameterised to move the tool closer than to the initial blank.

Example:



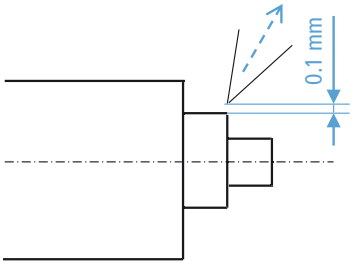
Time saving

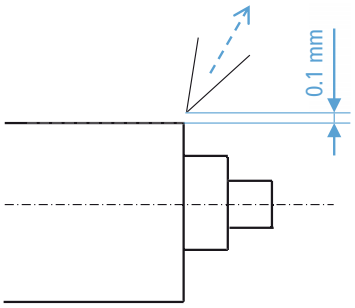


Time loss

Tool retraction

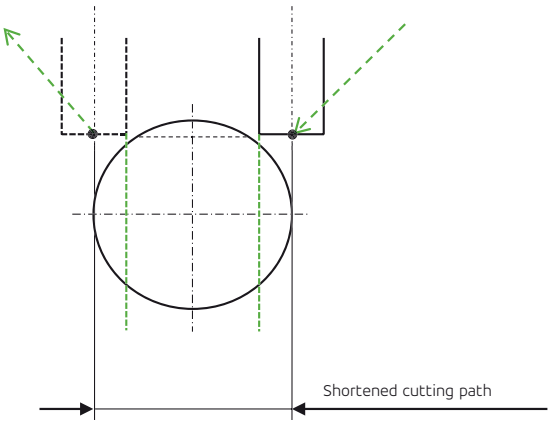
When retracting the tool from the material [G1], a safety distance of 0.1mm is more than enough before the tool is retracted at rapid traverse rate [G0], provided the tools have been precisely pre-set.

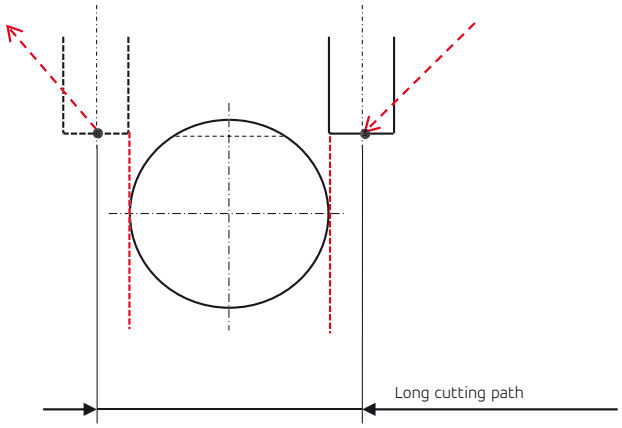




Approach/retraction of an end mill

In the case of cross milling, it should be considered that the tool can be advanced at a rapid traverse rate closer to the workpiece than the material diameter and safety distance. The same applies to tool retraction. The shorter the cutting path [G1], the more cycle time can be saved.

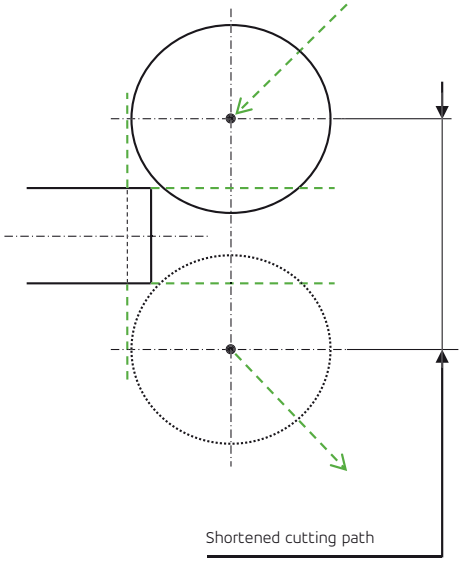


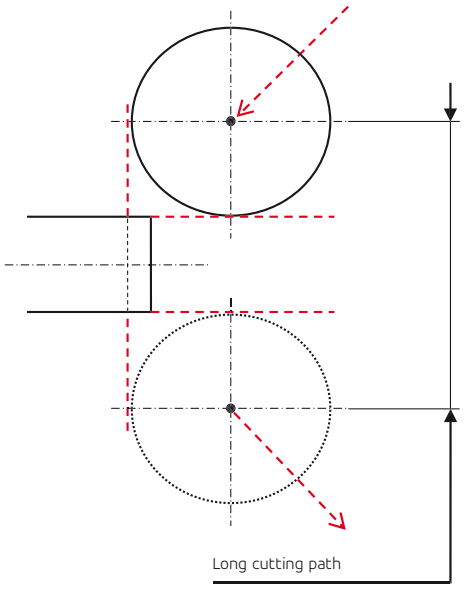


Approach/retraction of a slotting cutter

For slotting, the approach and retraction of the slotting cutter can be optimised by taking the tool diameter into account.
To do so, there are two solutions:

- *Programming the approach with tool path (i.e. tool radius) compensation [G41/G42]*
- *Optimising the approach by programming it with machine positions*





From left to right: Jürg Aegerter, Head of Sales & Marketing, Piero Tschanz, COO and Maurice Meytre, CEO.

YPSOTEC:

100 years *of ultimate precision*

The Swiss company Ypsotec, that was founded in Grenchen (Solothurn/Switzerland) in 1916 as Décolletage AG, focuses its activities on bar turning high-precision parts, just as the initial French company name 'Décolletage' implies. As a subsidiary of the Ypsomed Group, Ypsotec specialises in systems for the treatment of diabetes.

YPSOTEC
PRECISION SOLUTIONS

On its 100th anniversary, the company has decided to take the next step towards future and enter the field of multispindle technology, choosing a Tornos MultiSwiss 6x16.

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Technological leadership as company principle

Early on, Ypsotec discovered the benefits of numerical control (CNC) technology, purchasing its first CNC machine in 1980. Since then, Ypsotec has been maintaining its technological leadership by keeping investing in the constant renewal and modernization of its production facility. The motivation is simple, by investing the customers will benefit from an unmatched quality/cost/performance ratio. Eleven years ago, Ypsotec decided to establish a second production facility in Tábor in the Czech Republic. Both sites follow the same principle. The facilities are equipped with state-of-the art machines only to guarantee impeccable quality. Ypsotec Tábor primarily focuses on work that requires a higher portion of handling, operations such as milling, grinding and assembly.

Quality is at the heart of Ypsotec's strategy.

Full range of services

The services offered by Ypsotec comprise much more than just the bar turning of micro parts. The company also conducts a variety of further technologies such as milling, turning on fixed-headstock lathes and turret lathes, grinding, laser welding, laser marking and assembly. Nowadays, the company's strength lies in the fields of assembly and laser engraving.

"We are extremely flexible," Ypsotec's CEO Maurice Meytre declares. "We provide customers with turned and milled parts of the highest quality and can also perform laser engraving and laser welding tasks. In addition, we undertake the assembly of simple or even complex sub-assemblies. Ypsotec has been certified to the quality standards ISO 9001 and ISO 13485. We assure our customers of unconditional quality of our products and of the services rendered by us," the CEO emphasises.

Today, only 10% of the company's output is exclusively manufactured for Ypsomed. Over the past years, Ypsotec has diversified its production. The company now offers various solutions for the medical industry such as manufacturing bone screws, sports prostheses and medical instruments. The business also targets other industrial fields such as the pneumatic, automation and even drive engineering sectors. For customers all over the world, Ypsotec produces batches from 100 to 100,000 pieces.

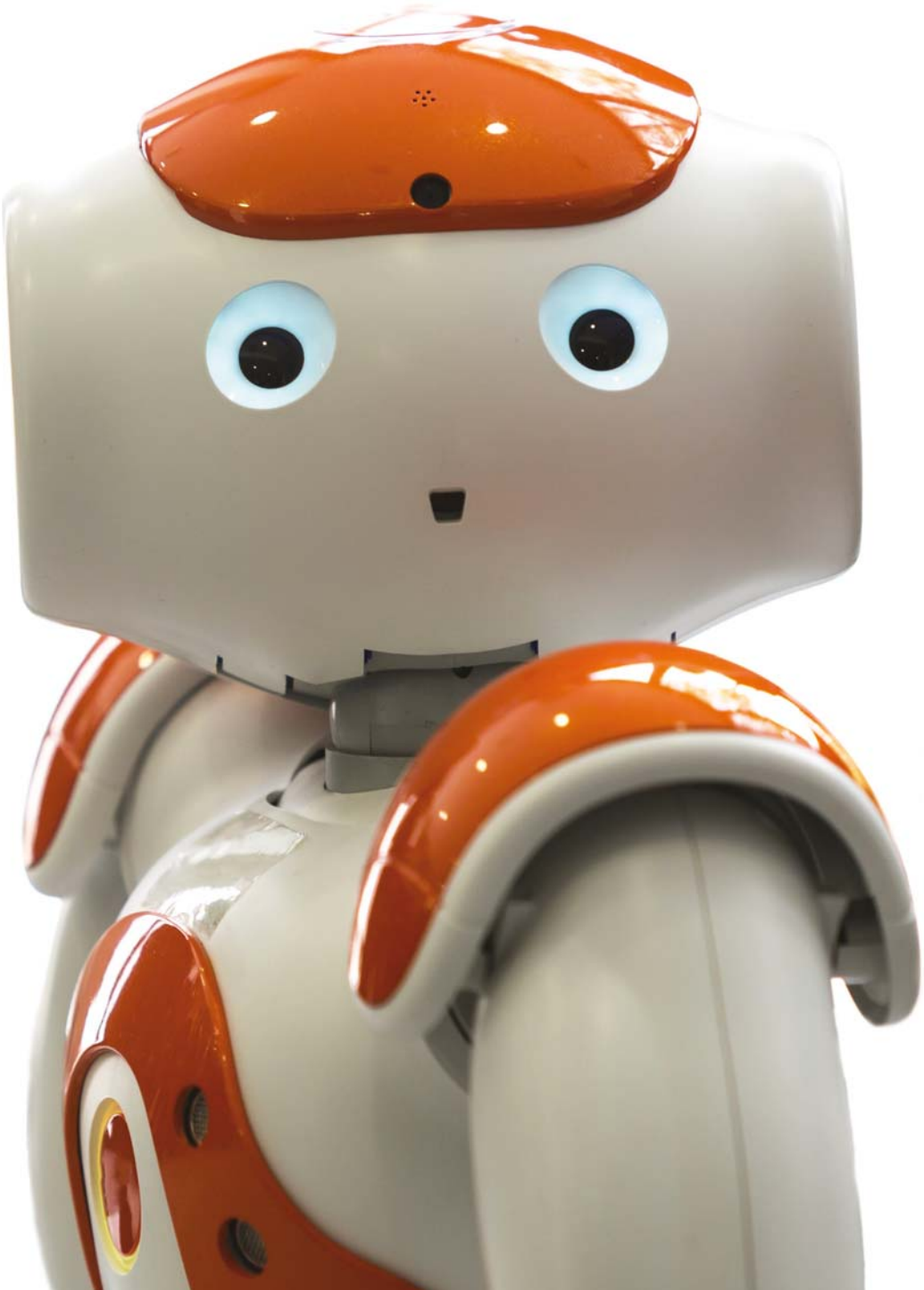
Challenge met

An urgent major order for 1,300,000 pieces by one of Ypsotec's customers brought the company to rethink its operation. First, the company managers had planned to outsource production to China for financial reasons but they understood they had to invest in new technologies to remain competitive. Ypsotec thus got the impetus to break new ground and the MultiSwiss entered the stage. Sales and Marketing manager Mr. Jürg Aegerter decided to enter into negotiations with his customer to jointly find a solution for in-house production of the parts.
According to COO Piero Tschanz, the targets set were difficult to achieve with the existing single spindle lathes: "We had to increase our productivity. At the same time, we wanted to avoid structural measures such as a plant expansion. Multispindle technology quickly came to the fore. After an initial analysis, MultiSwiss soon turned out to be a solution that aroused our interest."

“MultiSwiss soon turned out to be the solution”

An obvious choice

As far as ergonomics are concerned, the machine boasts various assets. It has fully integrated peripherals, excellent access to important areas and unequalled ease of use. In addition, maintenance has been facilitated enormously. The open machining area of the machine with front access is marvelous as the operator can literally enter the machine. To facilitate set-up work, Ypsotec is banking on Göltenbodt



Besides the medical sector – its special field –, Ypsotec supplies various other industries, especially robotics.

quick-change tool holders that prove to be highly flexible and very easy to use.
The MultiSwiss machine is the most compact and lightest machine currently available in the market and, what is more, it is easier to operate than any other machine. Ypsotec's decision for this machine was even reinforced by the excellent collaboration between the technical staff of Tornos and Ypsotec. The initial machine set-up was carried out in Moutier where the responsible Ypsotec engineers got the opportunity to make themselves familiar with the MultiSwiss machine.
"To date, the machine has proved to be a reliable partner and we are fully satisfied with the result. It was very easy for our employees to get accustomed to the new technology and the significant advantages of the machine features in terms of floor space as well as tremendous productivity. The hydrostatic bearings on this machine offers distinct benefits with regards to tool life and surface finish."

Comprehensive service

"Tornos' service is outstanding and fully comes up to our expectations. The rapid response and highly professional service are guaranteed. Should any question arise, we may rest assured that we get a fast and profound answer – even where machine programming is concerned. We are very pleased with our choice and feel confident that, with this machine, Ypsotec will be very well positioned for the competition for many years to come."

ypsotec.com

Ranging from easy-to-use, standard Swiss-type machines to high-production multispindle lathes, the Tornos machine range fits both Ensto's current and future needs.

Swiss DT 13 *solutions keep Ensto turning*

A new Tornos Swiss DT 13 Swiss-type lathe is helping global cleantech leader Ensto advance its vision of making life better with electricity. Headquartered in Porvoo on Finland's southern coast, about in 50 kilometers east of Helsinki, Ensto designs and provides smart electrical solutions to improve the safety, functionality, reliability and efficiency of smart grids, buildings and transportation.

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Ensto's new, high-production Swiss DT 13 was purchased through Tornos' full-service machine tool partner Makrum in Tampere, western Finland. This company supports the company in producing clean, recyclable, trusted and innovative products with a long lifetime and low life cycle environmental impact.

Jukka Jalo, a method engineer with Ensto Operations knows his way around machine tools and when he joined Ensto in September 2015, he concluded that an investment in easier-to-use production equipment was necessary. "My main work is in development projects in this industrial environment; developing and enhancing machining methods and designing and planning new preventive maintenance methods," Jalo explains. "One area is to look for new and future machining methods and machines."

While Ensto's existing production equipment had been a formidable investment, Jalo found that operator ease of use was lacking. The service and usability of previous machines was not at a level expected by today's manufacturing companies. So, he set out to find a partner that could support Ensto in terms of machines, service and training.

After pre-selecting three potential partners, Jalo and his team visited several booths at EMO 2015 and found that Tornos' machine range fit both Ensto's current and future needs, offering both easy-to-use, standard Swiss-type machines and high-production multispindle lathe solutions. From that point, Makrum and Tornos worked closely together to quickly support Ensto in its complete supplier selection process.

In November 2016, Jalo traveled to Moutier, Switzerland, with Ensto's development manager Tapani Ahonen and machinists Petri Martikainen and Janne Laaksonen to put the Tornos Swiss DT 13 through its paces. The team asked probing questions about the Swiss DT 13 technology. The engineers were amazed by the high quality test cuts that the Tornos machine produced. In fact, after watching the machine produce high-end connectors to

The face of Tornos in Finland

When manufacturers in Finland want the best of both worlds regarding premier metal cutting solutions and peerless customer service, they look to Tornos partner Makrum.

Situated in western Finland's most populous inland city, Tampere, Makrum is a full-service machine tool supplier. As the exclusive Finnish importer and dealer of some of the world's leading machine tool manufacturers, Makrum offers a wide selection of lathes, machining centers, boring and milling machines. Additionally, it offers a wide array of special purpose machine tools and highly productive automation solutions.

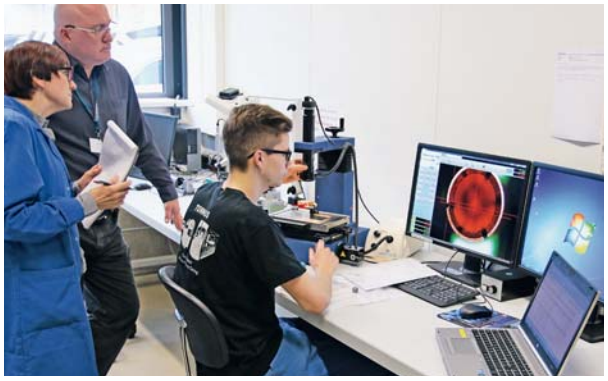
Moreover, Makrum delivers a full range of services from customer needs and assessments to turnkey delivery and comprehensive after-sales service.

"Customer Service is our top priority. Our team consists of highly skilled, experienced, and enthusiastic professionals dedicated to helping our customers find the best possible solutions to their specific needs," said Makrum Sales Manager Ismo Hyttinen. "High-quality service, training and product support are what keep the machines we sell running at peak performance. It also lays the foundation for good, long-term customer relationships."

Arnaud Macabies, Head of Sales in Northern, Southern and Eastern Europe at Tornos, said Makrum's long-time collaboration with Tornos is the key to the kind of fast, expert and streamlined service experienced by Ensto Finland Oy.

Hyttinen agreed: "The Finns and the Swiss share a very similar way of thinking in that we like to do things with consideration and precision," Hyttinen said. "Our mutually shared focus on flawless quality forms a good foundation for profitable collaboration between Makrum and Tornos. This ensures that customers in Finland achieve the highest level of success with their Tornos solutions."

“Our mutually shared focus on flawless quality… ensures that customers in Finland achieve the highest level of success with their Tornos solutions”



±3 micron precision, Jalo was impressed that such an affordable machine could produce such results.

“In one instance, the Ensto team tried to trick us by asking the setup engineer to start the machine and immediately saying, ‘We can measure the part now,’ said Makrum Sales Manager Ismo Hyttinen. “On cold startup, we produced the part to within 3 micron tolerance. After that, the acceptance test was just a technical detail.”

But those real-time results weren’t the only factors in Ensto’s choice of the Swiss DT 13. Jalo’s team was also impressed with the knowledge of Tornos’ application and setup engineers. The ability of Tornos proprietary TISIS programming software to connect to the internet to allow monitoring and maintenance was another major benefit. Another point of amazement was the relative silence of the Swiss DT 13 in operation; Ensto operators can listen to the radio next to the machine in operation.

Ensto took possession of its new Swiss DT 13 in March. In contrast to its older, existing machines that can take six months to achieve smooth operation, the Tornos was up, running and producing parts within two days. Ensto expects that trend to continue along the full life cycle of its new Tornos solutions. The company has its own maintenance engineers, trained at Tornos headquarters in Moutier, to perform simple tasks like adding lubricant to the central greasing units, cleaning collets, repairing small parts damaged during machining and ensuring that the machine and its components are in generally sound condition. More complex maintenance tasks will be handled by Makrum.

Jalo and his Ensto colleagues characterize the Swiss DT 13 testing and buying process as evidence of Tornos’ bold brand promise: ‘We keep you turning.’

ensto.com

APPLITEC

Swiss turning by APPLITEC

TURN-Line 300 Series

ISO-Line special Swiss

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SWISS TOOLING

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TORNOS

MultiSwiss 6x32

The MultiSwiss 6x32 shares the same base as the MultiSwiss 8x26 machine. It is equipped with six independent spindles with hydrostatic bearings and can turn bars up to 32 mm in diameter. To achieve excellent machining conditions at these diameters, the 11-Kw motor has an increased torque of 27 Nm (S6). The maximum spindle speed is 6000 rpm and the maximum part length is 65 mm. As an option, the machine can also be equipped with three Y axes.

tornos.com

32 mm, 27 Nm, perfect for large diameters

MultiSwiss 6x32

We keep you turning