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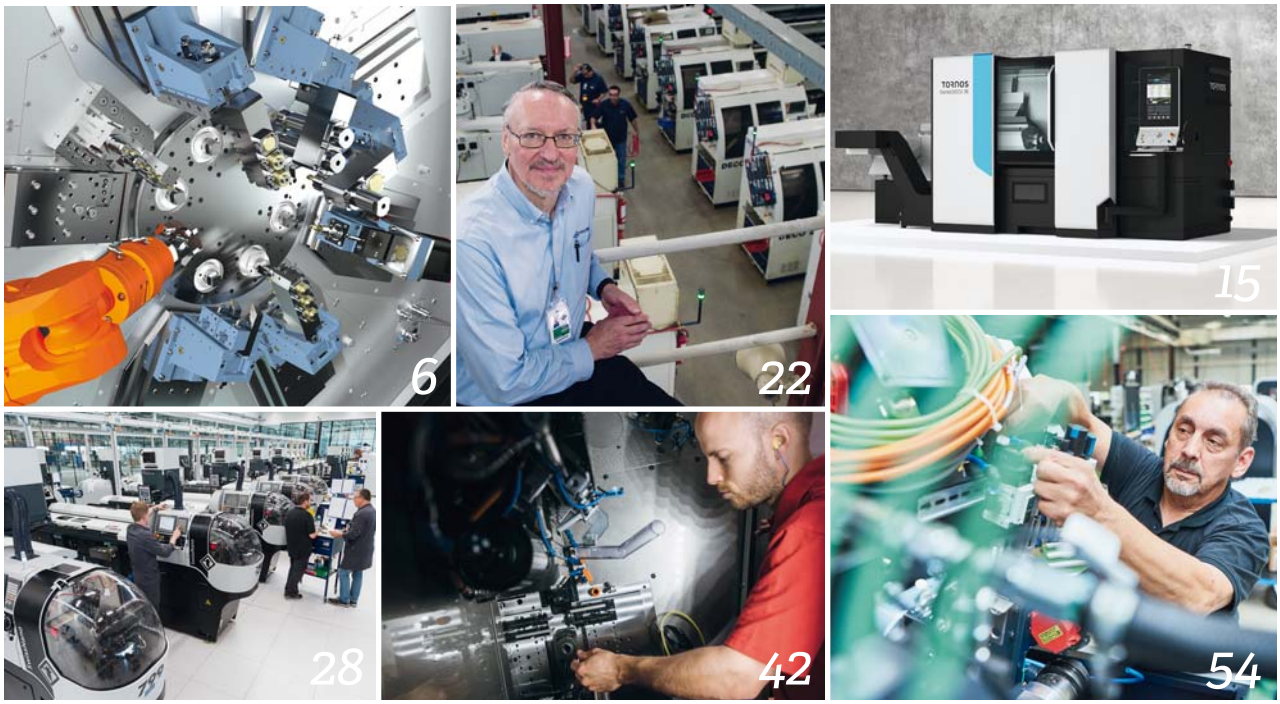

Cover page: The two cousins and founders of Polydec (Switzerland), Jean-François and Claude Konrad in the SwissNano workshop: "These machines have opened up new markets for us!" (See the article on page 28.)

SUMMARY

IMPRESSUM

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"Join us at EMO Hannover 2017 and experience for yourself how we keep you turning with workflow solutions spanning machines, software and services."

Heiko Benz Managing Director of Tornos Technologies Deutschland GmbH

Setting the course for the future at EMO

Heiko Benz[1] Managing Director of Tornos Technologies Deutschland GmbH

Just as the theme for EMO Hannover 2017 is "connecting systems for intelligent production," Tornos is setting the course for the future. We are doing that not only with Industry 4.0-ready solutions but with innovative products to help manufacturers meet their customers' needs in very demanding market segments. Our EMO Hannover 2017 booth (Hall 17, Stand D15) is the place to experience our future-shaping workflow solutions. We will also demonstrate our knowledge in the Industry 4.0 area (Hall 25, Stand B60).
Today, as never before, Tornos advances a promise to the market: We keep you turning. And our EMO Hannover 2017 presence will perfectly illustrate this commitment with a variety of Industry 4.0-enabling solutions to take manufacturers a step further toward this vision of a smarter, more productive and quality-centered manufacturing future.

Transform your Tornos Swiss-type lathe

A perfect example is the world premiere of a completely new solution: a robot that transforms any of our Swiss-type lathes into a state-of-the-art automated production cell. With this advanced technology, manufacturers get a single solution that can produce, clean, measure and sort machined parts and – when necessary – communicate in process corrections to each machine. Perfectly aligned with Industry 4.0, a Tornos production cell leverages machine-to-machine communication and to extend their productive machining time while achieving fewer defects related to human error.

All-new SwissDeco

Another future-forward workflow solution is our new SwissDeco multitasking single-spindle lathe to accelerate your success in demanding sectors like automotive, medical and dental, electronics and aeronautics. On our EMO stand, you will discover the SwissDeco 36. EMO Hannover 2017 is your opportunity to get a first look at how this solution ably machines the most demanding parts.

A complete range of MultiSwiss products

EMO Hannover 2017 is also the ideal opportunity to see – for the first time and all together in one place – our three MultiSwiss machines. With more than 200 MultiSwiss 6x16 machines installed on customers' sites worldwide, this range of solutions is a game changer. With the MultiSwiss, Tornos makes it easy to enter the world multispindle machining while increasing both the part quality and machine accessibility. Today, with the MultiSwiss 6x32 and MultiSwiss 8x26 – both designed based on the philosophy and the technology which proved so successful on the MultiSwiss 6x14 and MultiSwiss 6x16 – Tornos offer a full range of MultiSwiss solutions for producing parts measuring 4 to 32 mm in diameter.

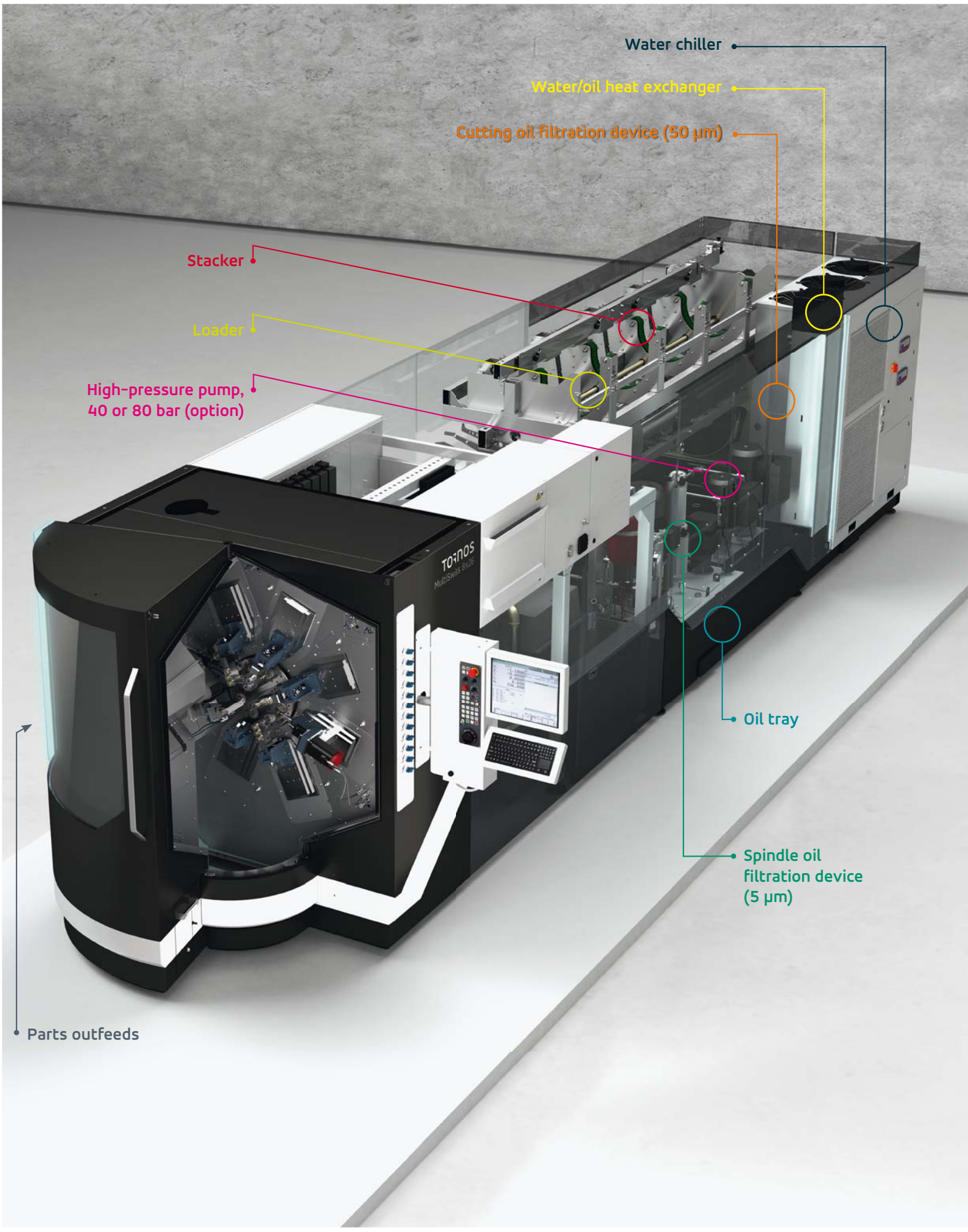
TISIS: your portal to Industry 4.0

EMO Hannover 2017 is also the ideal venue to experience our Industry 4.0-aligned TISIS programming software – live and in person. As your portal to Industry 4.0, TISIS puts the production efficiencies of Industry 4.0 within your grasp: It allows your operators to interactively interface with the machine and intervene during the machining process to manage unanticipated situations. The results are absolutely effortless programming and real-time process monitoring to drive your productivity and quality today and beyond.

I invite you to join us at EMO Hannover 2017 and experience for yourself how we keep you turning with workflow solutions spanning machines, software and services.

Yours sincerely,

[1] Heiko Benz will join Tornos Group on September 18, 2017.


Water chiller
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Stacker
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High-pressure pump,
40 or 80 bar (option)
Oil tray
Spindle oil
filtration device
(5 µm)
Parts outfeeds

MULTISWISS: more and more *capabilities*

We have already presented them repeatedly in decomagazine: our extremely efficient MultiSwiss machines.

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The part quality achieved with these machines are unequaled in the market and their capabilities are almost unlimited. A brochure presenting various optional equipment has just been published and we would like to take the opportunity to get back to the countless capabilities featured by MultiSwiss 6x16 and the MultiSwiss range in general. So, decomagazine has talked to Rocco Martoccia, Tornos' Product Manager responsible for MultiSwiss. Below is what he told us:

The MultiSwiss machines are very easy to handle. Needless to say they are able to produce highly complex parts with the optional Y axes, in addition to various other features. The slides may be equipped with up to 3 tools per position that enables the machines to keep up with competitive machines of higher complexity. Nevertheless, the machines are ultra-accessible for any operator, regardless of his physique. They are easy to use and boast excellent ergonomic features at a superb cost/performance ratio. It is often said that the MultiSwiss machines form a bridge between single-spindle lathes and the world of multi-spindle technology. We prefer to put it differently and emphasize the fact that, thanks to unique

"Thanks to its hydrostatic features, an excellent surface finish can be achieved and tool wear can be reduced by 30% to 40%"

technologies and an intelligent product design, we managed to make the world of multi-spindle technology accessible to the users of single-spindle lathes.

Technology at the service of the users #1

Users who are not used to working with multi-spindle machines, shrink away from investing in a complex system that, to their mind, is difficult to manage and to integrate with their workshop. Our MultiSwiss machines, come fully equipped with a container that contains the peripheral units specifically adapted to the machine. Consequently, the user gets a compact machine with suitable and tested peripheral equipment. By default, MultiSwiss is equipped with a loader, a cooling unit and a two-stage filter system. Apart from these units and the bar feeder, the machine enclosure comprises the chip conveyor whereas an optional oil mist extraction system can be easily connected. Thanks to this unique concept, a MultiSwiss can be installed instead of a single-spindle lathe with bar feeder or a cam-type machine of similar capacity. Furthermore, the peripherals have been specifically dimensioned for and adapted to the machine which makes the system a turnkey solution.

Technology at the service of the users #2

Apart from the space requirements, the programming of such a machine is another recurring concern for the users. Regarding this, the MultiSwiss

is much easier to use than one might expect. First, it comprises a PC integrated with the touch panel so that the TB-Deco software can be used directly on the machine. With this software, machine programming is very easy – the MultiSwiss machines are undoubtedly the machines with the highest ease of programming of the entire Tornos range. A MultiSwiss 6x16 machine is programmed in the same manner as seven lathes with 2 or 3 axes. We have a maximum number of 4 tools per position and everything is very easy. The software and machine carry out various synchronization processes and undertake bar feeding, workpiece clamping and part ejection.

Technology at the service of the users #3

A third concern of the customer usually relates to tool management. They often think that if production is five times faster, they have to adapt their machining strategies accordingly in order to avoid fivefold tool wear. On the whole, this may be true, but here as well, the MultiSwiss machine range offers a solution: thanks to its hydrostatic features, an excellent surface finish can be achieved and tool wear can be reduced by 30% to 40%. This significantly simplifies the management for machining on multi-spindle lathes. MultiSwiss has been specifically designed to make life easier for the operator. Against this backdrop, the connection points for lubrication have been arranged directly on the slides. The cooling lubricant supply is connected directly and the tool holders are provided with internal fluid channels for direct cutting oil supply to the tools. Special attention has been paid to the design of the tool holders in order to avoid chip traps. The chip conveyor and the open design of the machining zone facilitate chip management.

The MultiSwiss has really been designed with the operator in mind. The most difficult part is to make our customers understand that MultiSwiss is not a conventional multi-spindle lathe and that its use is not restricted to large-batch production. Many of our customers produce batches of 500 pieces and less on their MultiSwiss lathes. This is a true paradigm shift: henceforward, it is possible to work with a machine that has the output of five to eight single-spindle lathes while being as easy and fast to set up as only one of the mentioned lathes. Interested customers find this hard to believe when are talking about this issue. Fortunately, with more than 250 machines that are already being used in workshops, it is quite easy for us to demonstrate reality by referencing to current machine users.

Suitable options for any demand

Just recently, we finished a brochure specifying the options for the MultiSwiss 6x16 machine. You are invited to discover it under https://goo.gl/GoS9T1

This brochure specifies various options such as stationary or driven tool holders. The portfolio comprises a vast range of tool holders and quick-change tool holders are also available upon request. It should be noted that all driven tool holders for MultiSwiss feature a Plug & Run system. The drive system and the tool holders form an integral unit and the tool holders are recognized by the machine as soon as the appropriate plugs have been connected - everything is ready for use. Various auxiliary attachments are available: radial or front drills/milling cutters, thread whirling unit.

MultiSwiss enables all types of machining to be performed with ease. On MultiSwiss 6x16, up to three tools can be mounted at each position. MultiSwiss 8x26 and MultiSwiss 6x32 can even accommodate four of them. Just a few clicks and you will find a whole range of tool holders that enable you to tackle any machining challenge. And, what's more, the machine can be equipped with a tool wear management system and a remote maintenance function for even enhanced ease of use. A brochure with the options for the MultiSwiss 8x26 and MultiSwiss 6x32 machines is under preparation.

A 'Chucker' version

Depending on the market requirements, billet or blank clamping, i.e. a so-called 'Chucker' version of the machine is required. By replacing the bar feeding system with a supply system for drop-forged or forged blanks, the production cost can be cut down drastically. Based on the specific requirements, workpiece loading can be realized in different ways (by means of gravity, linear axis or 5-axis robot). With its open kinematics that leaves plenty of space for the loading device, MultiSwiss is the ideal platform for this kind of application. Thanks to its mobile spindle, it is no longer necessary to equip the machine with micrometer stops since the Z axis permits numerical

A machine renowned for its precision

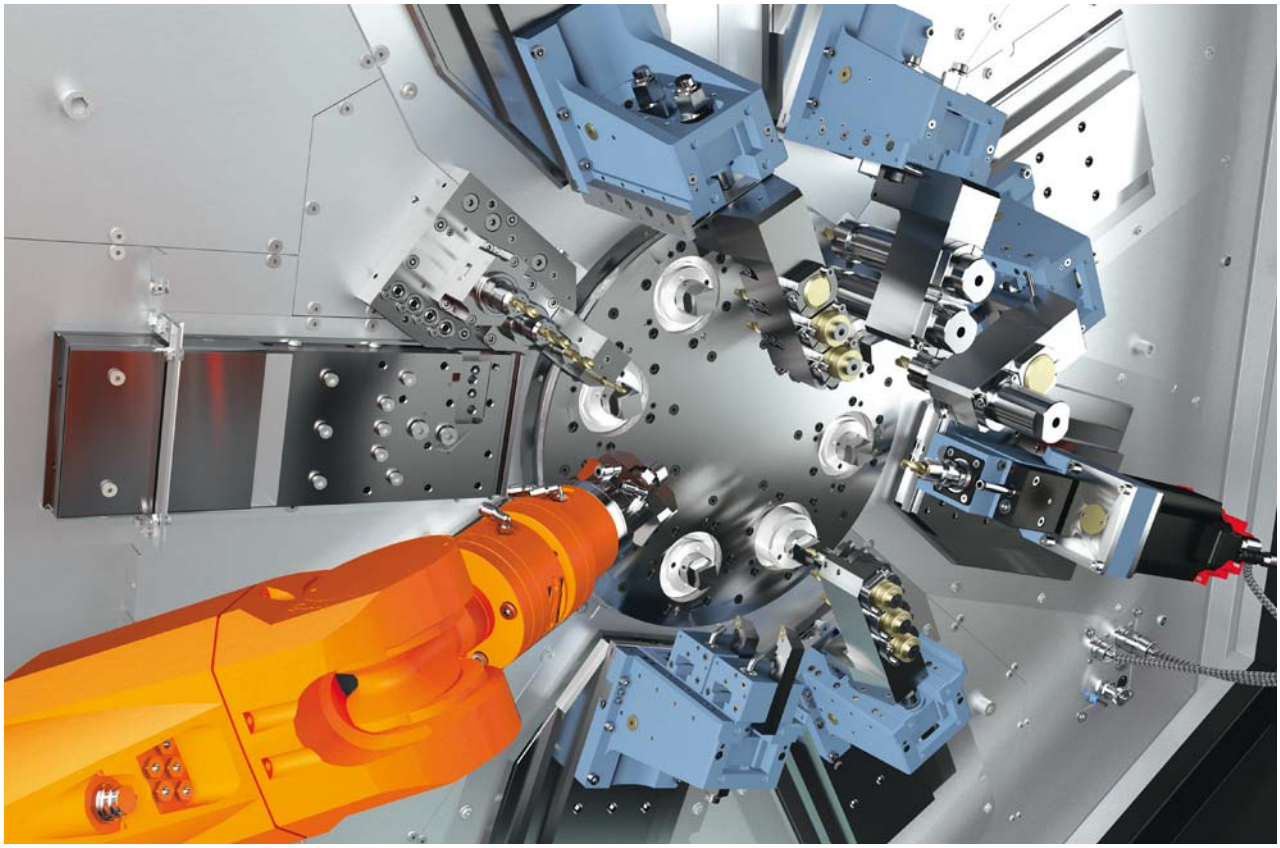
Since the MultiSwiss unites various embedded technologies, it is able to reach a precision and a production consistency that are seldom available in a multi-spindle lathe. With this machine, precision tolerances of +/- 5 microns can be achieved, and these can even be reduced further.

"For fuel injection systems for cars, the complex part geometries have to be machined with an accuracy tolerance not exceeding 2µm, and MultiSwiss is the perfect partner to meet this challenge"

In our last decomag, we presented the German company Berger Feintechnik based in Ummendorf. Just recently, the company purchased Tornos' 200th MultiSwiss machine. It has 2,400 employees and is manufacturing at 12 production sites. Berger supplies famous companies throughout the world with complex turned, milled and ground high-precision parts with diameters from 2 to 1,800 mm and with lengths up to 3,000 mm 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.

As you could read in the decomag article from 2015, Berger was requested by a leading OEM to supply a key component of an advanced direct fuel injection system, an order volume amounting to about 16 million parts. Herbert Maurer recalls that the requirements are fierce in this industry. 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 2µm. The production of 16 million parts under these conditions is a major challenge. After a period of assessment, Berger determined the MultiSwiss was the only machine that was able to realize this workpiece. Pursuant to Herbert Maurer, Berger's plant manager in Ummendorf, "MultiSwiss is simply the most precise lathe at the moment."

For further information, you are invited to discover or re-discover the article about Berger Feintechnik in decomag No. 80 on our website www.tornos.com. Our technical staff will be glad to analyze your specific requirements and to provide you with a tailor-made solution.



Loading can also be realized by means of a 5-axis robot.

monitoring of the gap between the spindles. This is a unique feature in the market that makes the MultiSwiss machine stand out as an upgradeable, unprecedented solution.

Automated part outlet

The part outlet can be adapted to the customer's requirements, too. The MultiSwiss range offers a vast variety of solutions for efficient part removal from the machine. The standard part outlet can be supplemented by a conveyor belt or by a carousel system enabling segmentation of the production run by batches. These systems may be complemented with a vacuum (venturi) system used to efficiently handle the ejection of small parts. The carousel systems can be adapted based on the desired system autonomy and on the type of the parts to be manufactured.

You can choose between the small internal device and several types of external carousels. Once the programmed quantity of parts has been achieved, the carousel is indexed by one position and the parts fall into the next tray. The output of one day is thus split into several batches. This device can also be used for a production configured for parts of the the same family in order to enable automatic workpiece change (multi-program functionality).

As you can see, MultiSwiss is a fully featured machining solution. Our experts will be pleased to help you and to provide answers to your questions no matter how complex. Please do not hesitate to contact them to discuss your individual machining issues with them.

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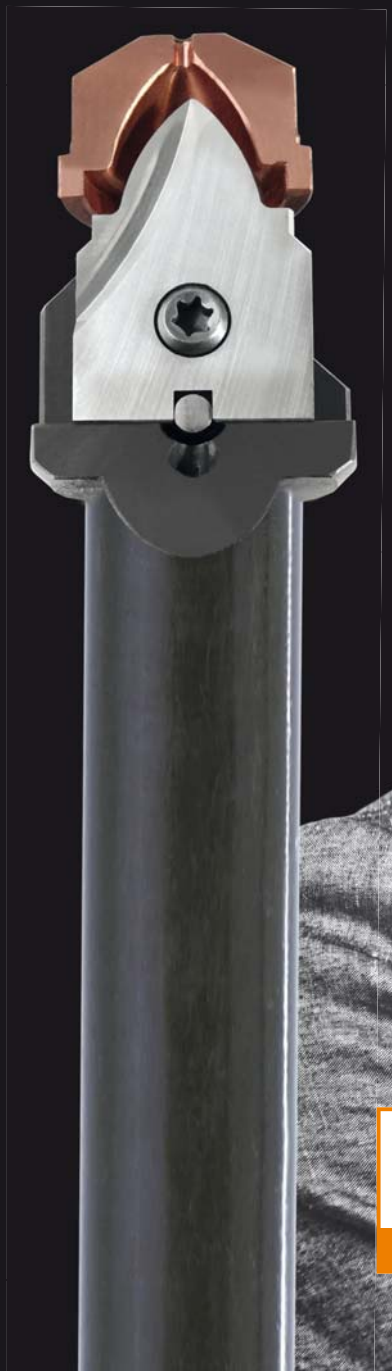

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Experience our future-shaping workflow solutions *at EMO Hannover 2017*

Industry 4.0, also called the Fourth Industrial Revolution, is under way, and EMO Hannover 2017 is the place to experience Tornos' future-shaping workflow solutions to take you there, from machines to software to services. On our modern, 327-square-meter stand at Hall 17, booth D 15, you will discover why manufacturers worldwide and across a wide array of industries turn to Tornos.

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Whether you are in automotive, micromechanics, electronic components or medical and dental, Tornos keeps you turning — and the future-shaping solutions you will experience on our EMO Hannover 2017 booth are proof of this commitment. From September 18-23 in Hannover, Germany, you will encounter an intriguing array of Industry 4.0-enabling solutions to take you a step further toward high performance, perfect quality and increased uptime.

Among the workflow solutions we will present at EMO Hannover 2017 are our all-new, SwissDeco multitasking Swiss-type lathe; an all-new automation cell; and an ongoing, live introduction of our Industry 4.0 enabling TISIS process monitoring software.

World premiere: Get a glimpse of the future

Transform your Tornos single-spindle lathe into a state-of-the-art production cell with our new robot for cleaning, sorting and measuring the parts you produce — and, when necessary — communicate

in-process corrections to each machine due to closed loop monitoring. That means your workflow proceeds uninterrupted because the correction to the tool offset in the CNC is made without manual intervention. Our new robot can be connected to several machines producing the same parts, allowing you to take your operation to new levels of autonomy, productivity and quality.

World premiere: SwissDeco

EMO Hannover 2017 also marks the world premiere of our new SwissDeco multitasking single-spindle lathe, particularly suitable in very demanding segments such as automotive, medical and dental, electronics and aeronautics due to its enhanced machining and tooling solutions. Direct benefits of the SwissDeco, are optimized programming tools and perfectly conceived ergonomics to speed up parts programming and shorten machine preparation and setup. This strong, 36-mm-diameter machine integrates a 12-position turret that allows it to machine the most demanding parts. Seamless integration of options such as the oil mist extractor, chip conveyor, heat exchanger, fire protection system, high pressure pumps, or a bar loader is assured. It is your unique opportunity to see the SwissDeco this year; our experts will be present on the booth to collect your first impressions and your feedback on the SwissDeco.

World premiere: a live look at the future with TISIS

Visitors to our EMO Hannover 2017 stand will also experience TISIS live, with Tornos service engineers analyzing the status of each connected Tornos machine at EMO. TISIS machine communication and programming software is manufacturers' portal to the production efficiencies envisioned by Industry 4.0. With TISIS, machine operators get more interactive means of interfacing and intervening to manage unexpected situations. This smart and advanced ISO code editor puts you on the fast track to truly effortless programming and real-time process monitoring — even on your smartphone. Available in both full and lite versions, TISIS knows your Tornos machine fleet and can help you decide which machine to use for a specific part and, at the same time, enables you to assess each machine's options, reduces collisions and related downtime, eliminates the possibility of errors, and enhances your productivity, efficiency and quality. To date, more than 1,000 TISIS licenses have been sold worldwide.

Be inspired by Tornos' wide array of solutions

In addition to those impressive world premieres, Tornos' EMO 2017 guests are invited to get inspired by several existing solutions.

MultiSwiss 6x16 & MultiSwiss 6x32

Our MultiSwiss 6x16, accommodating workpieces up to 16 mm in diameter and 40 mm long, has 14 linear axis and seven C axes, and the MultiSwiss 6x32 accommodating workpieces up to 32 mm in diameter and 65 mm long, has up to 19 linear axes and seven C axes. Productivity on both solutions can be further boosted by the addition of up to three Y axis on the MultiSwiss 6x32 and one Y axis on the MultiSwiss 6x16. This MultiSwiss platform is based on an "all-in-one" concept combines the benefits of single-spindle turning machines with the advantages of multi-spindle machines. Highly productive, just one MultiSwiss can replace multiple single-spindle lathes while providing more production capacity in less floor space and with fewer operators.
Thanks to its motorized barrel, these solutions achieve the same production rates as cam-type multispindle machines — but with even quieter operation. Their superb ergonomics, incorporating front access and integrated peripherals, make setup a snap, and their simplified programming makes it easy for single-spindle operators to get great results from the start. The machines ultra-dynamic and entirely independent spindles allow angular positioning and optimal speeds in each position. Since each spindle has its own Z axis with hydrostatic bearings, you get flawless finishes and extend the lifetime of your tools by 30 to 40 percent.

MultiSwiss 8x26

MultiSwiss 8x26 accommodating workpieces up to 26 mm in diameter and equipped with eight spindles. Each position can have up to four tools. The MultiSwiss 8x26 takes performance to a new level in terms of both complexity and productivity. Thanks to its eight highly dynamic synchronous motor spindles and ultra-fast barrel indexing, the new MultiSwiss 8x26 can produce turned parts to help users achieve very high levels of productivity. Its powerful 11-kW motor spindles boast high torque (16.1 Nm) and operate independently to insure the optimum speed for each operation as well as controlled positioning in operation and counter operation. Reaching speeds of 8000 rpm in only a few tenths of a second, these motor spindles make a major contribution to the machine's performance. As an option, the machine can be equipped with multiple Y axes to boost its capability and allow more tools and full control of the Y axis for off center-holes or any specific milling operation. The machine is available in three configurations: without Y axis (entry level); with three Y axes (intermediate); with six Y axes (complete) for the most complex parts.

SwissNano

Our SwissNano, the champion for manufacturing small workpieces requiring very high precision. The machine's unique kinematics enable turning, drilling, gear hobbing, polygon milling, cutting, deburring, roughing and finishing operations, allowing it to produce two-thirds of watch movement components, from the simple to the most complex, and it's equally adept at executing micro medical and dental parts

with extreme quality, precision and consistency in production.
Behind the SwissNano is a machine concept delivering exemplary balance, and its thermal management allows operating temperature to be reached rapidly so that you're quickly on your way to achieving perfect results. Thanks to its excellent thermal stability and its rigidity, once in production the machine can produce parts with tight tolerances while minimizing the tool wear. This compact solution offers excellent accessibility for easy setup, and can be used with a fixed/rotating guide bushing — or no guide bushing at all.

Swiss GT 32

Tornos' Swiss GT 32 makes it easy for you to manufacture even the market's most complex parts. With its very powerful and versatile linear axis kinematics, your operator can work in both main and counter operations with three numerical axes. With its innovative design ensuring good rigidity and a powerful 8,000 rpm spindle, the Swiss GT 32 and Tornos take the Swiss-type lathe into a new era and provides a solution to help manufacturers gain a competitive edge in new and lucrative industrial segments. At EMO Hannover 2017, Tornos will showcase the Swiss GT 32 B with the optional five simultaneous axis control, The innovative design of the Swiss GT 32 B accommodates 2 x 4 rotating tool spindles with a spindle speed of up to 9,000 rpm. This high-speed driven tool station incorporates a 1 kW spindle motor

Tornos EvoDeco 10 in the Industry 4.0 area

In 2014, shortly after Steulet Microtechnique SA was established in Delémont in the Swiss Jura region, we featured the company in our decomagazine. The company's CEO told us that they had trusted the Tornos EvoDeco 10 machines for the production of high-end watch components for major watch manufacturers — proof of the incredible possibilities of the EvoDeco 10 and the EvoDeco range. Today, with its four independent tools system it has the most productive and popular kinematics on the market. This is one more reason why there are 10,000 Deco and EvoDeco solutions installed worldwide. This impressive machine will be also presented at the EMO Hannover 2017. On top of its incredible machining capability, the EvoDeco 10 will be presented live with Tornos' Industry 4.0 capabilities in the Industries 4.0 area in the Hall 25, booth B60. Our Industry 4.0 specialist will give a detailed Industry 4.0 presentation at 1:30 p.m., September 21, 2017.
As you probably know, 2017 is 20th anniversary of the Deco range and our "Time to Turn" promotion has been extended to December 31, 2017. This is a unique opportunity to celebrate the 20th anniversary of our flagship Deco machines while getting exclusive savings and access to the latest Deco technology. We're making it easy for you to trade up to a new EvoDeco by offering you 40,000 EUR (32,000 GBP) on your existing Deco machine. And — once your new EvoDeco is configured — you'll benefit from a special price. Contact us today and take the first step toward reaching highest productivity.*

* Trade up conditions: the machine is able to produce and is not damaged. Offer available until the 31th of December 2017.

for machining difficult-to-cut materials and performing heavy roughing. Furthermore, the kinematics of the new Swiss GT 32 B provide the facility for 2 x 4 fixed front tool stations, ensuring that virtually any angle can be indexed or processed by the numerical control programs.

Swiss DT 26

EMO Hannover 2017 is also the place to experience of popular Swiss DT 26, an entry level, 25.4 mm machine with five linear axes. This extremely powerful machine is designed to easily withstand heavy-duty machining. Its wide machining area optimizes chip flow, and its modular tooling zone — unique in this machine range — makes it a snap to mount a thread whirling or polygonal milling device. This easy-to-use, flexible workhorse offers a quick return on investment in today's demanding business environment.

Almac BA 1008 HP

The Almac BA 1008 HP expands the range of the Almac BA. Working from the bar and equipped with four frontal spindles, three lateral spindles and two back operation spindles, the machine features a through-spindle cooling system for faster, more precise machining of a wide variety of materials, while optimizing fluid and chips management.
The Almac BA 1008 HP is completely aligned with Industry 4.0. In addition to having the monitoring functions offered by the TISIS software suite, the has an integrated probing system that allows it to automatically correct itself to compensate for tool wear. The Almac BA 1008 HP will also be presented with a tool changer for six tools for the lateral spindle block. This feature further enhances this small machine's already advanced system and impressive capability. Thanks to this new option, the Almac BA 1008 HP can work with up to eight tools in the lateral spindle block.

Almac CU 2007

Almac CU 2007, combining dynamic performance and outstanding reliability with Swiss expertise to provide an affordable and truly innovative solution. This gateway to three- and five-axis machining brings together comprehensive standard equipment and combined engineering expertise to create optimal conditions for producing complex workpieces. With its powerful, high-performance 20,000 rpm milling spindle, 60 m/min rapid feed rate, and 16, 24-position HSK-E40 tool changer, this solution ably tackles main plates, bridges and other complex watch components, as well as small parts machined from billets. Five-axis configuration and a 40-position tool changer are available. As a novelty this year, the machine will be equipped with a bar loader, transforming the CU 2007 into a real production machine able to mill, turn and machine the sixth face of parts at a very interesting price/performance ratio. These characteristics make the Almac CU 2007 a unique solution on the market.

Tornos Service

With Tornos Service, you realize true value throughout the full product life cycle of each of your Tornos machines. Tornos Service's productivity-enabling services include start-up assistance; expert training and coaching; free hotline; on-site operations support and preventive maintenance; original spare parts seamlessly delivered worldwide; complete overhauls to extend the longevity of Tornos machines; and a range of operations and X-change Modules to expand your application capabilities and profitability.

Join us at EMO Hannover 2017 — and experience how we keep you turning with workflow solutions conceived to advance your productivity, quality and profit.

We look forward welcoming you to Tornos' booth at EMO Hannover 2017 and to discussing your manufacturing challenges.

tornos.com

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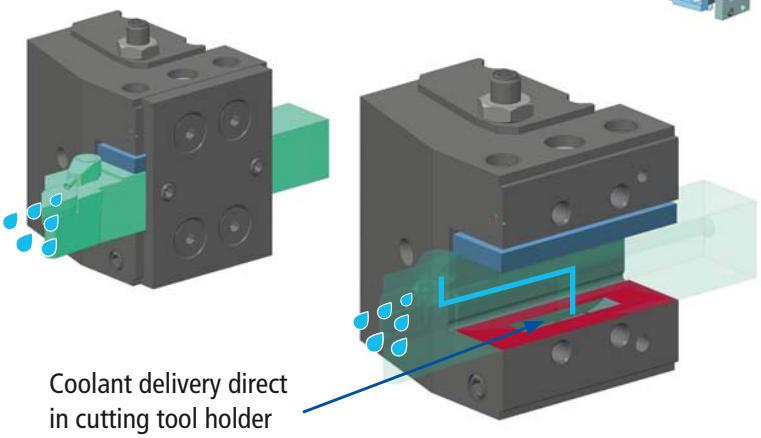

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HAROLD HABEGGER

Cox Manufacturing President and CEO William T. "Bill" Cox, Jr. relies on a vast fleet of Tornos machines, including a new SwissNano.

COX MANUFACTURING: *advancing* a legacy *of delivering confidence*

When William T. "Bill" Cox, Jr. talks about his business, the conversation turns easily and naturally to the Cox Manufacturing Company's watchword – Cox delivers confidence – and the Tornos technologies that help him make good on that promise every day.

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www.coxmanufacturing.com

Situated in northeastern San Antonio, Texas (US), one of three metropolitan Texas cities that make up the Texas Triangle megaregion, Cox Manufacturing specializes in custom screw machine products and computer numerical control (CNC) turning and machining. The company's customer-centric legacy began in 1956, when Cox's father, William T. Cox, Sr., founded the company and started making bobbins for the early computer memory systems.

"We are committed to doing what we say. We don't give up. Perseverance is one of our core values. We put a lot of emphasis on building systems to manage orders and that helps us maintaining blanket order relationships and ensure quick delivery to our customers," Cox explains. "Because of the robust processes we have in place, our customers know they won't encounter any surprises when they do business with us."

Cox Manufacturing started with his father's bold bid to start "some sort of manufacturing company" after coming across a Swiss-type screw machine at an auction. Though he had limited knowledge

"The beauty of the SwissNano is the access and ergonomics, which make it so much easier to work with fine, small parts"

about the machine and knew next to nothing about automatic screw machines and Swiss automatics, the senior Cox was passionate about manufacturing and had a prowess for solving engineering problems. Those were the cornerstones on which he built a business that today is a leading supplier of precision machining services throughout the US Southwest. Cox Manufacturing today supplies high-volume, tailor-made components for some of industry's most discerning customers in aerospace, automotive, trucking, defense and medtech.

Off and running at an early age to continue building the business

Bill Cox's commitment to the family business began early: After his father's sudden death in 1968, when he was just 12 years old, his mother took him aside and explained that Cox Manufacturing's biggest customer was interested in buying the business. Was he interested in someday running the business himself? His answer was an emphatic, "Yes," and he was off and running in his quest to learn everything necessary to continue building on the foundation his father had established. He quickly learned to read financial statements and joining his mother in meetings with bankers, lawyers, accountants and contractors.

"I realized early on that the diversity of our customer base was limited: 80 percent of our business was with the electronics industry. We were highly dependent on five customers buying the same product from us, and I realized that we needed to learn to make other parts," Cox explains. After attending Texas A&M University for two years, just long enough to take the courses that would serve Cox Manufacturing and its soon-to-be growing customer base, the 20-year-old Cox began working full-time at the family business.

"What guided me even more than those college courses was reading 15 years of technical conference transcripts that my father had accumulated from the Precision Machine Products Association (formerly the

Bill Cox with Cox Manufacturing's new Tornos SwissNano.

Swiss-type machine technician Isreal Carrillo with the new Tornos SwissNano.

Cox Manufacturing Deco team members show off their workmanship. Pictured (left to right) are Brad Carrol, assistant team leader; Jose Lopez, team leader; and T.J. Rodgers, apprentice.

National Screw Machine Products Association)," says Cox. *"The association also had manuals on corporate financial management, job costing and estimating, and I read those, too."*

Always looking to the future with Tornos technologies

When he joined the business full time, Cox Manufacturing was using Bechler and Index machines, as well as some Swiss-type machines and Index single-spindle cam machines – but Cox was looking to the future. He began buying up used Tornos Deco machines and today owns more than 30 of them.

"The tooling and basic machine strategies are similar, so the wealth of knowledge we had accumulated with the competitor's machines was transferrable," he says. "We found that the higher precision Tornos machines were more cost effective in the long run, despite the higher capital investment, because they were more efficient."

Cox Manufacturing took a big leap in 1980, with its move into a new building constructed on land that Cox and his mother purchased – looking toward the future – when he was still in high school.

"When I look back, it still amazes me because nothing happened overnight. We were thinking ahead, though, by buying that land and building the facility, moving into multispindle machines," he says. "Today, we have 33 Deco machines, including the Deco 10, Deco 13 and Deco 20 and we still run a few Tornos R10, R125 and MS-7 cam machines, but we are gradually retiring those and replacing them with Tornos CNC machines."

SwissNano is a perfect fit in more ways than one

Most recently, Cox bought a new Tornos SwissNano and he already has his eye on future SwissNano purchases.

"The beauty of the SwissNano is the access and ergonomics, which make it so much easier to work with fine, small parts," he explains. "A good example

is a precision brass medical part with +/- 10 microns-tolerances. The stability of the machine and its ease of use make the SwissNano a lot more efficient than other options. Previously, we would have made this part with a Deco 10 and, before that, on an MS-7."

Moreover, he says, the SwissNano fits nicely into the same workshop footprint as an MS-7, and the investment will serve his business well for years to come.

"I know the SwissNano will still be holding tolerances 20 to 30 years from now, and we can rebuild it after 20 years," he says. "This purchase is part of a long-term strategy. Today, we are still experimenting with the SwissNano, but we've tested it on medical, automotive and electronics parts. We see ourselves acquiring more SwissNano machines in the future."

Cox anticipates continued growth for his business. Cox Manufacturing just completed a 6,000-square foot addition to serve as a materials warehouse and plans are in place to add another production facility in the next couple of years.
"I'm very optimistic about US manufacturing," Cox said. "Throughout my career, US manufacturers have been under siege with people being convinced that manufacturing is not important and that the service economy is the future. But I'm seeing manufacturing resurging in the US, and I know we can compete with the right technology. Tornos technology is part of the equation for us."

A high-volume aluminum hydraulic component made on a Tornos Deco machine.

coxmanufacturing.com

A highly precise brass medical device component produced on Cox Manufacturing's new SwissNano.

Claude Konrad, CEO of Polydec SA and his daughter Vanina in front of a Cadillac which bears the stamp "Biel-Bienne 1958" and which represents the golden age of the automobile production in Biel/Bienne.

POLYDEC AND TORNOS

in line with a long-standing

automobile tradition

More than 50% of the world's automobiles contain parts that were manufactured in Biel/Bienne (Switzerland) by Polydec SA. Even if Biel/Bienne is primarily known as a watchmaking city with head offices of some of the great global brands, the city can also look back on a long history in the automotive sector. Cars had been manufactured here in 1889, and from the 1950s onwards, tens of thousands of vehicles for consumers all across Europe have been produced in Biel/Bienne by General Motors. Biel/Bienne continued its success story with Claude Konrad, head of Polydec SA, a manufacturer that largely relies on over thirty Deco, EvoDeco and SwissNano Tornos machines.

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As a subcontractor specialized in the production of small high-precision parts, Polydec SA manufactures more than 40 million parts per month, especially for the watchmaking, medical and automobile industries. For the latter, over 20 million shafts intended for dashboards and fuel injection systems are produced in Polydec's workshops each month. To this day, the company has produced more than five and a half billion parts in Biel/Bienne.

Automobiles and Biel/Bienne? A long success story

Although the company Henriod Frères had been producing cars in Biel/Bienne since the 1880s, the golden age of this sector began some decades later. On February 5th, 1936, an 8-cylinder Buick rolled off the production line at General Motors. In the same year, 321 Chevrolet, 115 Buick, 61 Oldsmobile,

“On a regular basis, we are producing to tolerances of ±2 µ and, in extreme cases, we even have to go down to ±1 µ”

36 La Salle, 117 Vauxhall, and 318 Opel cars were produced. When Henriod Frères closed down in 1975, as many as 329,864 vehicles had been produced in Biel/Bienne! In 1985, Polydec SA was founded and in 1998 it got the QS:9000 certification for the automobile industry. Today, the company's expertise is recognized far and wide and Polydec SA is one of the very few suppliers of parts for actuators (micro motors) that are used for dashboards.

Tornos and Polydec? A long success story

In 1999, the company decided to invest in its first Deco 10 machine. This solution turned out to be a good strategic choice, so further machines soon followed. This first Deco is still active today and is being used in a workshop equipped with a total of 15 Deco machines, one EvoDeco and twelve SwissNano machines. For the oldest machines, a revision program is under implementation. For other workpiece types, the manufacturer has an inventory of about forty Escomatic machines. “We have grown up with

With more than 100 production machines operated in a controlled environment, the working conditions of the Biel/Bienne-based company are simply excellent.

Tornos and are fully satisfied with our choice," the company's CEO explains. Just recently, Tornos delivered the 200th SwissNano to Polydec, which provided an opportunity to celebrate almost 20 years of collaboration and success.

Parts meeting extreme demands

As far as metal cutting is concerned, Polydec SA is pushing the envelope and recently, the company machined steel parts with diameters down to 0.07 mm (which corresponds to the diameter of a human hair!) and a length of 0.3 mm. The parts are then polished and quenched. Even if this may be an extreme example, Polydec SA regularly processes workpieces of 0.3 mm diameter that demand a number of machining processes such as drilling or polygon cutting. Mr. Konrad explains: "When we reach such dimensions, the mechanical system no longer reacts normally and the cutting speed is virtually zero." He adds: "On a regular basis, we are producing to tolerances of ±2 µ and, in extreme cases, we even have to go down to ±1 µ." Even if the company has high-tech production means at its disposal, it's the proficiency and skills of its operators both in terms of machining and measurement that is essential to reach such results.

12 SwissNano at the service of precision

After one year of testing, the first SwissNano was assessed as being highly efficient and the company soon ordered 11 additional machines. The CEO explains: "We are extremely happy with this small machine; not only is it equipped with state-of-the-art technologies – to name just the spindle motor – but it has also a compact design that enables it to easily fit into every workshop. Furthermore, its precision is really excellent." Asked about the contribution SwissNano makes to the company, the CEO adds: "The machine has definitely opened up new possibilities as regards the realization of small high-precision parts."

12 SwissNano at the service of precision. “The machine has definitely opened up new possibilities as regards the realization of small high-precision parts” Claude Konrad, Polydec.


SwissNano

The parts produced through micro-turning may not be very complex in terms of geometry. However, their production with the required quality and precision and at the agreed price while heeding a specific deadline is a real day-to-day challenge.

The production of tiny parts may be a challenge, but it's also challenging to inspect them. Polydec SA has established a process that enabled the company to sign a quality delegation agreement with a large group. This agreement stipulates that Polydec SA provides the warranty for the parts and that the manufacturer does not carry out an incoming goods inspection anymore!

The specialist's point of view

Express interview with Cyril Soom, young specialist working with SwissNano.

decomagazine: What do you think of SwissNano's ergonomics?

Cyril Soom: *It boasts an appealing design, perfect visibility and very good accessibility. I had to get used to the machine because despite its good visibility, the available space is a bit confined for an operator who used to work with Deco machines. Of course, it's not possible even for SwissNano machines to be very compact and offer a vast machining area at the same time! Today, I enjoy working with this machine type. They are well enclosed, tight and very clean so they are pleasant to work with.*

dm: Do you carry out particular operations?

C.S.: *We performed some stamping work but this machine has not been designed for such type of operations. Apart from that, we carry out all turning and gear cutting operations on it. The asset of this machine is definitely the quality level that we can achieve. This is really remarkable for a machine with such a small footprint and offered at such an attractive price.*

dm: And what about service?

C.S.: *On a whole, we are satisfied with our relationship with Tornos and the Tornos after-sales service is efficient. However, as to SwissNano, I actually cannot comment on the service because throughout three years of use of this machine, it was not necessary to call after-sales service.*

A first-class management system...

Polydec SA is well-known for its specialist expertise. The company's know-how acquired through the realization of parts meeting extreme demands benefits all markets supplied by it, especially the automobile industry. Benefiting from the certification in accordance with ISO:9001 and the automobile standard ISO/TS 16949, the company is focusing on the realization of high value-added parts with diameters up to 4 mm. Mr. Konrad explains: "The quality processes are fully integrated and are part of our recipe for success." Even before their confirmation, the orders are analyzed by APQP (Advanced Product Quality Planning). Mr. Konrad adds: "From an external point of view, this may seem to be cumbersome but, for us, it is an important step that enables us to warrant the quality of our parts already at the time of order confirmation and to largely avoid subsequent problems."

... to offer unparalleled services

By combining its technical, people and administrative skills, Polydec SA is capable of sharing its entire know-how with all its fields of activity. Mr. Konrad explains: "The watchmaking sector, for instance, is in the process of radically changing its approach towards metal cutting. Many experts from the automobile sector are now working in the watchmaking division and, here, they introduce strict methods that may deter anyone who is not familiar with them." He adds: "In the automobile sector, there are extreme cases in which we have to deliver parts with a reject rate of zero ppm, i.e. we have to assure that not even a single part of one million supplied parts is out of tolerance. For this purpose, we have installed automatic inspection systems that enable us to subject all of the parts to an extensive inspection. In watchmaking, however, considering the appearance and high-precision issues, the 0ppm rate is still a dream of the future."

Where humans make the difference

The company offers its expertise gained in the electronic and automobile industries e.g. to the watchmaking and medical sectors as well, but this is not enough. Every field has its own constraints e.g. in terms of finishing and visual or dimensional inspection. "When talking about micron accuracy, the measuring devices are reaching their limits. So, we have to learn constantly to be able to adapt ourselves to the needs and requirements of our customers," the CEO explains. Know-how is the prerequisite for Swiss companies to stand out and to secure jobs in Switzerland. The staff reflects this pursuit of performance. "Our customers are very demanding and we know that an average performance in most cases is not sufficient; we cannot afford such mediocrity. Our challenge is to create favorable framework conditions for our colleagues to be able to support this philosophy," Mr. Konrad concludes. It is not uncommon that 'little geniuses' from Polydec find innovative solutions for customers and the customers cannot understand how it is possible to realize machining with such levels of performance.

Automobile tradition that has a bright future

Even if often forgotten, the automotive sector that has its roots in local history is rather important. This field has created jobs and has showcased the high quality of Swiss know-how far beyond the borders for more than 120 years – and it goes on! Polydec SA is a worthy successor. Based on its recognized expertise, the company can expand its activities to the fields of watchmaking and medical engineering today.

Microtechnology "made in Biel/Bienne" never ceased to astonish the whole world.

polydec.ch

Hobbing, drilling, milling...

a great number of new options

The range of operations that can be realized on Tornos machines is constantly broadening. In this latest decomagazine edition, we would like to present you with the various new hobbing, drilling and milling capabilities on offer.

TORNOS

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New option – hobbing on the Swiss DT 26, Swiss GT 13, Swiss GT 26, Swiss GT 32 and Swiss ST 26

Recently, we presented the hobbing module for the Swiss DT 13 in our decomagazine. From now on, this feature will be available for a large range of machines. For the Swiss DT 26, Swiss GT 13, Swiss GT 26, Swiss GT 32 and Swiss ST 26 machines, Tornos now offers a new hobbing module for gears with longitudinal profile. This unit allows a significant expansion of the range of applications that can be realized on these machines.

Designed to hob splined shafts and gear profiles in continuous operation, this option offers interesting prospects. This process has already proven its merits and is a huge success especially in the automotive and medical industries (see Okay article on page 48). This highly appreciated option enables the users to finish their workpieces without reworking operations.

The cost per part is thus considerably reduced and the part quality is significantly higher. The hobbing unit can easily be adapted to the rear gang tool post of the Swiss GT machines as well as to the Swiss DT 26's main gang tool post. The installation of the module is child's play and, of course the TISIS programming software allows convenient programming.

Benefits

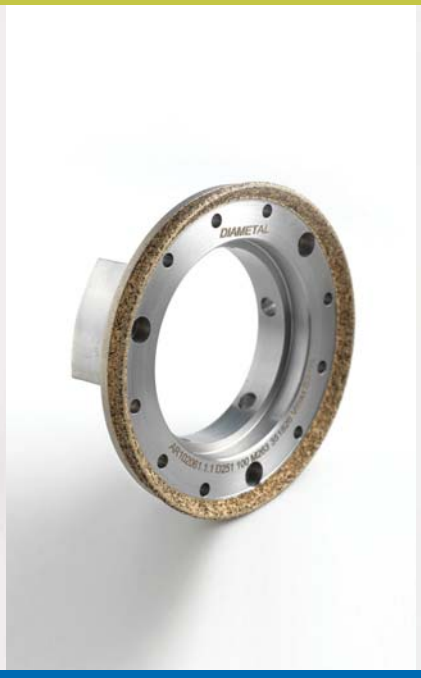
- *Elimination of gear reworking operations.*
- *Guaranteed concentricity between hobbing and boring (example).*
- *Gains in time and floor space.*
- *Significantly increased productivity.*

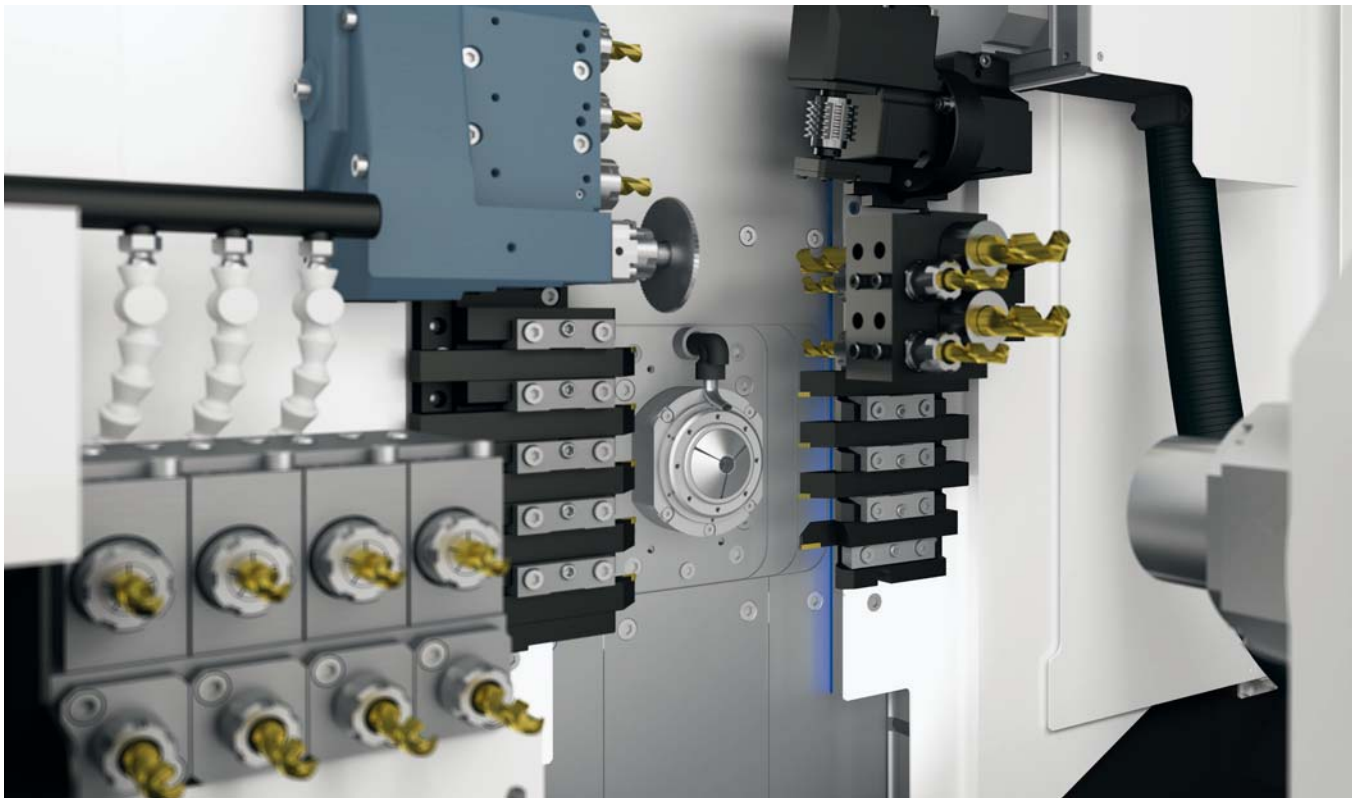
Option

Swiss DT 26: 258-1750
Swiss GT 13: 256-1750
Swiss GT 26: 248-1750
Swiss GT 32: 548-1750
Swiss ST 26: 246-1750

Specifications

Angular adjustment: +/- 15°
Max. transmittable torque: 7 Nm
Max. milling cutter diameter: 32 mm
Max. milling cutter width: 30 mm
Boring: 10 mm
Max. number of modules (m): 1
Quality in accordance with DIN: 7-8





Gear hobbing on Swiss GT 26 and Swiss GT 32.

New option – dual axial drilling attachment ER 11

This twin drilling/milling unit is compatible with the Swiss DT 26, Swiss GT 32, Swiss GT 26, Swiss GT 13, and Swiss ST 26 machines to increase their capabilities. Provided with this unit, the user can envisage various front machining processes. Main and back machining operations can be performed. Depending on the type and configuration of the machine, it is possible to mount 2 or 3 units. An emulsion-compatible version of this unit is offered as an option. This option is now available.

Option

Swiss GT 32: 548-1660
Swiss GT 26: 248-1660
Swiss GT 13: 256-1660
Swiss DT 26: 258-1660
Swiss ST 26: 246-1660

The devices presented here can be adapted to any of the Tornos machines Swiss DT 26, Swiss GT 13, Swiss GT 26, Swiss GT 32 and the Swiss ST 26.

If you are interested in detailed information, do not hesitate to contact your Tornos representation.

tornos.com

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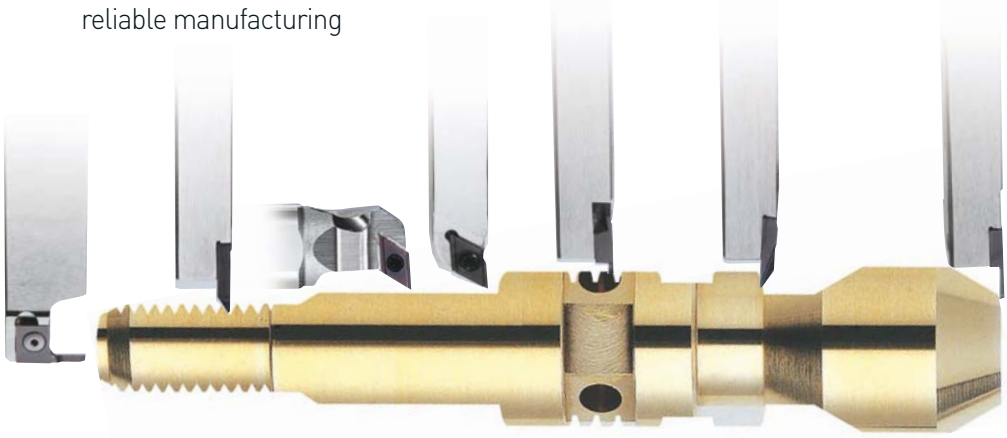

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"We simply have to be flexible. In the manufacturing cell for the medical industry, for instance, we carry out new set-ups every day. For some parts made of tough materials, new tools are required daily."
José Freire – Lauener SA

LAUENER: 20 years *of success with Deco*

In 1997, we met the young specialist engineers Rosario di Gerlando and José Freire who had been discovering "Deco's one-touch operation"[1] with the very first Deco machine delivered by Tornos. This machine is still in use today in Lauener's workshop and its operating hours meter displays a total of 76,301 operating hours. The dashing young men have become experienced specialists now. In Boudry, we now met Emmanuel Raffner, CEO, José Freire, medical department manager and Rosario di Gerlando, training manager.

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Twenty years later, the enterprise has almost 150 machines, about fifteen of them being cam-type lathes. The dedicated workshop for medical products, which represent about 50% of the sales, is equipped with Deco and EvoDeco machines only. Mr. Freire explains: "The Deco/EvoDeco product is really accomplished and we are fully familiar with it."

Certification – and more

The company has been certified according to ISO: 9001, ISO: 14001 and ISO: 13485, but, as Mr. Raffner says: "These standards are a good basis for us to validate our processes. However, the requirements of our customers are consistently more demanding. This is the reason why we focus on two fields – watch making and the medical industry. It's also why we purchase equipment that enables us to meet the specific demands." And while, a couple of years ago, the gap between watchmaking and medical industry in terms of demands and process monitoring was still great,

[1] Click here to see the article: https://goo.gl/gWJxX9

"We decided to purchase the machines due to their flexibility, productivity and precision – and they did not disappoint us"

this gap has reduced fast. The General Manager adds: "7 or 8 years ago, the workpieces were produced in the main process and, if required, they were finished in a finishing process. Today, a single bar turning process suffices to produce and finish the parts."

Rigor being the watchword

Even if standards may seem to be restrictive (especially as far as the validation process is concerned), they provide a rigor that ensures optimum control and traceability of the process. This is of benefit to process stability and all employees are aware of this. Mr. Raffner tells us: "We managed to overcome the culturally motivated idea that standards have a restrictive effect. Yes, standards are restricting, but we know that the same standards make our company more precise and competitive." This rigor is the tangible expression for the quality idea that is the same throughout the world.

Shared know-how...

It's true that the expertise gathered in the field of medical technology has benefited watch-making, and vice versa. The latter especially applies to the know-how required to produce minute parts. "Our experience in watchmaking and especially in the manufacture of watch movement parts with a size of less than one millimeter helps us to produce ophthalmic needles with a diameter of a few hundredths of millimeters," Mr. Freire declares. The realization of such parts is the standard for Lauener.

... for a large variety of products

Today, Lauener is specialized in just two fields of activities, but within these fields, a huge variety of products are manufactured. The types of the parts produced differ considerably. In this way, a potential decline in demand for a specific part or even its disappearance have less impact on the company. Mr. Raffner gives us an example: "The life cycle of our customers' products definitely has an impact on our product range. That's why it is important for us to diversify our product portfolio in order to be

able to balance and anticipate the future equipment requirements as far as possible. It should be noted that the evolution of the measuring devices and the introduction of statistical process measurement lead to a revision of certain manufacturing processes and of the type of the machine used." Mr. Freire adds: "The same is true in the medical industry. Nowadays, we barely manufacture any orthopaedic screws. Other products have replaced them." Such continuous changes certainly have an impact on the philosophy, the organization and the production.

Flexibility and validation

In line with this open-mindedness, the production must not only be flexible. In fact, it must be capable of simply reproducing the prototyping processes and the processes for small-batch production in a real production cycle. "We simply have to be flexible. In a manufacturing cell for the medical industry, we carry out new set-ups every day. For some parts made of tough materials, new tools are required daily," the department manager declares.

Training as the key to the company's success

As far as awareness and vocational education are concerned, Lauener has always attached great importance to training. Incidentally, in the course of the introduction of the TB-Deco software in 1997, the company substantially contributed to the training of its employees in the use of the Windows tools. This was done by organizing training courses and financing 2/3 of the acquisition cost for home computers for the employees.

The philosophy of continuous training is still alive. Mr. Di Gerlando explains: "We offer training for various audience types, such as apprentice training and vocational re-training in the form of basic training. For our employees, we certainly offer continuous training intended to update and enhance their expertise."

Lauener enables its staff to make progress and to develop further. Mr. Raffner adds: "We consider the training of apprentices to be an investment. We don't only work for Lauener but also for the entire Swiss micro-technology industry. And this is essential for the future." For the customers, competent and motivated staff is another advantage.

Prices, deadlines and reliability

As a matter of course, the customers want to get their parts by just-in-time delivery. This means at the price and within the deadline and under the conditions that each have been agreed upon. However, the

From left to right: Rosario Di Gerlando, training manager and José Freire, medical department manager.

security of supply is equally important to them. They need to know that they can rely on their supplier. To be able to offer this service to its customers, Lauener mainly banks on versatility and multiplication of the resources. Consequently, there is no problem should it not be possible to manufacture a medical part on the regular machine; the processes can be validated and the production monitoring system enables the bar turner to work on another machine of the homogenous machine inventory.

Deco, EvoDeco, controlled processes

The machine pool, which consists of Deco and EvoDeco machines and is supervised by Mr. Freire, is a paramount example for homogeneity. Both the kinematic system and the programming of the first Deco machines of 1996 are similar to those of the EvoDeco machines supplied last (and also of the machines that have not been delivered yet). Since that time, numerous attachments and tool holders have been provided with an interchangeable design. "We decided to purchase the machines due to their flexibility, productivity and precision – and they did not disappoint us. They fully meet the current requirements and will certainly meet the future ones. These machines are extremely versatile and we can produce virtually any part on them," the manager declares and he adds: "For us, the kinematic system and the PELD language are the main strong points of the Deco and EvoDeco machines[2]. For the production of complex parts, this couple remains the best in the market. These machines can machine workpieces that no other machine can realize." Thanks to its optimum control characteristics, a new EvoDeco machine installed at Lauener can be made fully operational in less than one week.

Customer-oriented approach of Tornos

Asked about the responsiveness and quality of the Tornos service, the Lauener managers tell us: "We are fully satisfied with our relationship with Tornos and we are following the evolution of the Tornos products with great interest. We consider the new multi-spindle lathes, for instance, to be really interesting. For one and a half year now, we have been feeling that Tornos is following an even more customer-oriented approach and this confirmed our decision for our means of production."

As close to excellence as possible

Mr. Raffner concludes: "These days, for Lauener, just as for all our colleagues, the challenge is to keep an industrial enterprise in Switzerland running. Not only do we need the best means of production, we also must be most efficient and as close to excellence as possible, at all times."

lauener.ch

[2] Programming Extended Language for Deco – programming using the programming language PELD facilitates work for those users who have to program part families. A single program is needed to produce various similar workpieces. Programming errors are significantly reduced by using variables.

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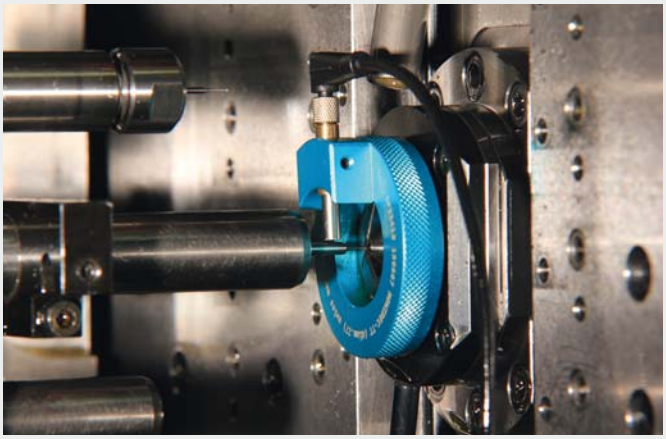

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Mario Chaves, General Manager of Okay Industries Costa Rica, and Kendrick Miranda sales representative of Mayprod in Costa Rica, in front of the Tornos SwissNano.

Mr. José Ulate, Machine Technician, ready to launch the production on the brand new Tornos SwissNano.

OKAY INDUSTRIES:

SwissNano helps

Costa Rica division achieve new level of precision

US-based Okay Industries is investing US $2 million to expand its Costa Rica operation. Okay Medical and Precision Components Manufacturing and its new high-precision Tornos SwissNano Swiss-type lathe are a key part of the company's investment strategy. The Division's General Manager, Mario Chaves, says the SwissNano helps his operation take on new high-precision medical manufacturing projects.

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With 340 employees on sites in New Britain, CT (US); Berlin, CT (US); and Montecillos, Alajuela, Costa Rica, Okay Industries is a leading medical manufacturer with unsurpassed expertise in stamping and machining a wide range of metals, including stainless steels implantable titanium and nitinol. Okay also specializes in automotive, defense/firearms and industrial applications with an emphasis on 'rethinking the ordinary' to deliver extraordinary solutions meeting customers' manufacturing and business needs.

Medical manufacturing leadership

Launched in 2012, Okay Industries' Costa Rica division is situated in a 1,300 square meter (14,000-square-foot) facility in the nation's Montecillos Free Trade Zone Z in Alajuela municipality. In Alajuela, Okay Industries manufactures medical and other precision components using multi-axis CNC machine tools, Swiss-type turning, die-sinking, wire electrical discharge machining (EDM) and general machining.

One of the projects with the SwissNano – producing a 1.5 mm x 1.5 mm medical device used in breast cancer surgery – requires Okay Industries to take its precision manufacturing expertise to a new level.

From high-volume production to tooling, production, spare parts and assembly fixtures, Okay Industries ensures that customers can count on a highly skilled production workforce as well as global engineering leadership and ever-evolving technical innovation.

"Our operation in Costa Rica has been growing steadily since we started in 2012. Costa Rica has a growing medical sector with many original equipment manufacturers (OEMs) here, so our Alajuela site positions us to collaborate closely with them and serve their needs," says Chaves, whose 30-plus years of manufacturing experience includes tooling expertise across a variety of industries and 17 years in management. "Additionally, Costa Rica has an excellent pool of talent, from engineers to machinists, because we have a lot of good technical schools. Our location, just a two-and-a-half-hour flight to the US or four to five days by boat is another plus."

SwissNano takes precision to a new level

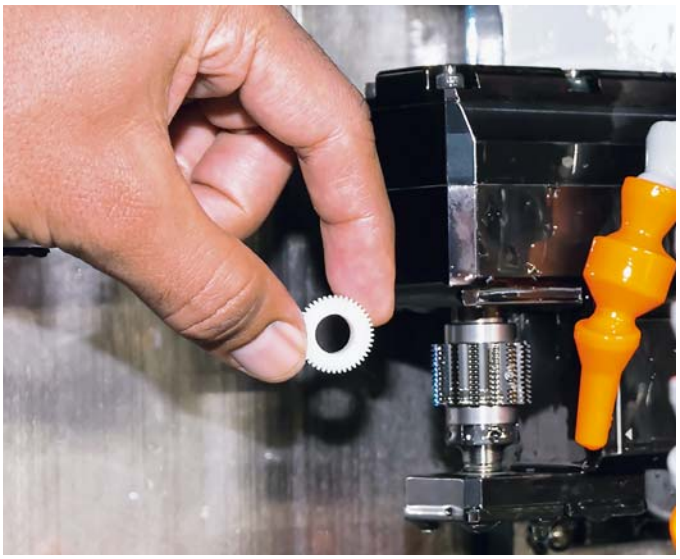
Okay Industries recently became the first manufacturer in Latin America to own a Swiss Nano. The machine is part of its investment strategy to continue going beyond the ordinary to meet its customers' needs.

"Our Tornos SwissNano is part of our expansion project. We recently won two new, very good projects demanding an increased equipment investment," he says. One of those projects is producing a 1,5 mm x 1,5 mm medical device used in breast cancer surgery. It requires Okay Industries to take its precision manufacturing expertise to a new level.

"The SwissNano has already exceeded our expectations by demonstrating very good stability on the required part dimensions," says Chaves, who is already imagining the machine's potential for other applications. In the perfect scenario, we will have

some additional capacity with our SwissNano to win additional high-precision projects that we know exist."

Moreover, the SwissNano heralded as the most precise machine of its type on today's market helps Okay Industries demonstrate its full value to potential customers. And that supports the company's vision: "Okay Industries will be the most trusted partner of custom-engineered precision components and assemblies by combining our 100-year-plus foundation in tooling expertise, our leadership in innovation and our employees' commitment to excellence."



Mr. Leslie Bonilla, machine technician, in front of the Tornos Swiss GT 26, the machine is equipped with a gear hobbling device.

"It was the performance of the Swiss GT 26 that led us to look at the SwissNano"

It started with the Swiss GT 26

Already experienced and impressed with Tornos' Swiss GT 26 equipped with a gear hobbing device. So, it was only natural for Okay Industries to turn to Tornos in its quest to invest in a high-precision Swiss-type lathe.

"With the Swiss GT 26, we are able to produce a plastic gear for a medical device. With the Swiss GT 26, we have been able to cut our cycle times on specific parts by more than 50 percent," Chaves says. "It was the performance of the Swiss GT 26 that led us to look at the SwissNano."

He says the SwissNano extends Okay Industries' machining expertise to a nano-precision level with its ability to load and unload very small (less than 3 mm diameter) bar stock. Its advanced ergonomics allow the machine operator to have the guide bush in front of him, and it shares the TISIS common interface with the Swiss GT 26. The SwissNano affords easy setup for even the most intricate parts due to fully

Mayprod keeps manufacturers at technology's cutting edge

When Central American manufacturers demand cutting edge machine tool technology, they turn to Mayprod; Tornos' exclusive distributor in that market. Located in San Salvador, El Salvador, Mayprod prides itself on being Central American manufacturers' supplier of choice for first-class machine tools and accessories, service and technical support.

"We are able to offer not just Swiss-type machines, but the original and only Swiss-made Swiss-type machines in the world: Tornos"

Founded in 1987 by Carlos Huezo Sr., Mayprod today has 30 employees and serves El Salvator, Guatemala, Costa Rica and Nicaragua. The company also has plans to expand into Honduras by the end of 2017. The founder's vision of bringing modern, computer-numerical control (CNC) technology to Central America continues, says his son and Mayprod Operational Manager Carlos A. Huezo.

"Metalworking in Central America today is still dominated by manual machines and Costa Rica with its growing medical device manufacturing sector is the exception," he said. "Our biggest product is conventional lathes and our customers know that we specialize in machine tools, so they return to us again and again. At the same time, customers are today realizing the importance of CNC technology and with Tornos' advanced Swiss-type lathe technology, we can provide it to them."

Mayprod recently sold the first Tornos SwissNano in all of Latin America, and in only a year since launching its partnership with Tornos, the company has sold a total of three Tornos machines. That success demonstrates the enormous potential of the Central American market and Costa Rica in particular, Heuzo said.

With the global population aging and technology diffusion paving the way to increased miniaturization, medical device manufacturing is flourishing in Costa Rica. These factors drive a need for high-end, high-performance solutions like the Tornos SwissNano.

"It's a niche machine that no Tornos competitor can offer," Huezo said. "Having access to such technology, along with Mayprod's unparalleled machine tool industry expertise and commitment to top-notch service throughout the machine's life cycle – appeals to customers," he added.

"We put a lot of emphasis on post-sales service and technical support and this truly differentiates us from other machine tool distributors in our market," Huezo explained. "We really care about our customers and they know that when they buy a machine from us, they can count on very little downtime. This is an exciting time for Mayprod because we are able to offer not just Swiss-type machines, but the original and only Swiss-made Swiss-type machines in the world - Tornos."

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numerical axes. With the SwissNano's high thermal stability and rigidity, Okay Industries can deliver the uncompromising precision levels its customers demand.

Impressive results

"In our first part runs on the SwissNano, the results were very impressive, with virtually no variation between the first part and the 200th part," Chaves says.

He emphasizes that the TISIS programming software, Tornos' Industry 4.0 portal makes it easy for machine operators to achieve superb results with both the Swiss GT 26 and the SwissNano. TISIS addresses and improves the human element of manufacturing and that is important to Chaves.

"One of the chief reasons I joined the Okay Industries family was President Jason Howey's focus on and interest in people," Chaves says. "The human side is the most important part of the company. We focus on hiring and developing good citizens."

TISIS helps Chaves' employees achieve superior results for the company – and its customers – just as the SwissNano ramps Okay Industries' potential to outperform competitors.

"We are keeping pace with the big trends influencing medical component manufacturing. Parts are becoming smaller and customers require more solutions and we want to be the partner who can provide the best end results with the best price and technologies," he says.

A bright future

Chaves sees a bright future for Okay Industries' Costa Rica operation and for its collaboration with Tornos. "There are a lot of opportunities for Tornos and our company. Tornos has very good equipment. In fact, when we were at Tornos headquarters in Moutier, Switzerland for the commissioning of our SwissNano, I was very impressed with the Tornos MultiSwiss," he explained. "I can actually picture this machine on our workshop floor. I don't have a project yet to justify the purchase of a MultiSwiss, but we are looking for one."

Meanwhile, Tornos solutions help keep Okay Medical and Precision Components Manufacturing and its 65-strong workforce on track to achieve its ambitious vision.

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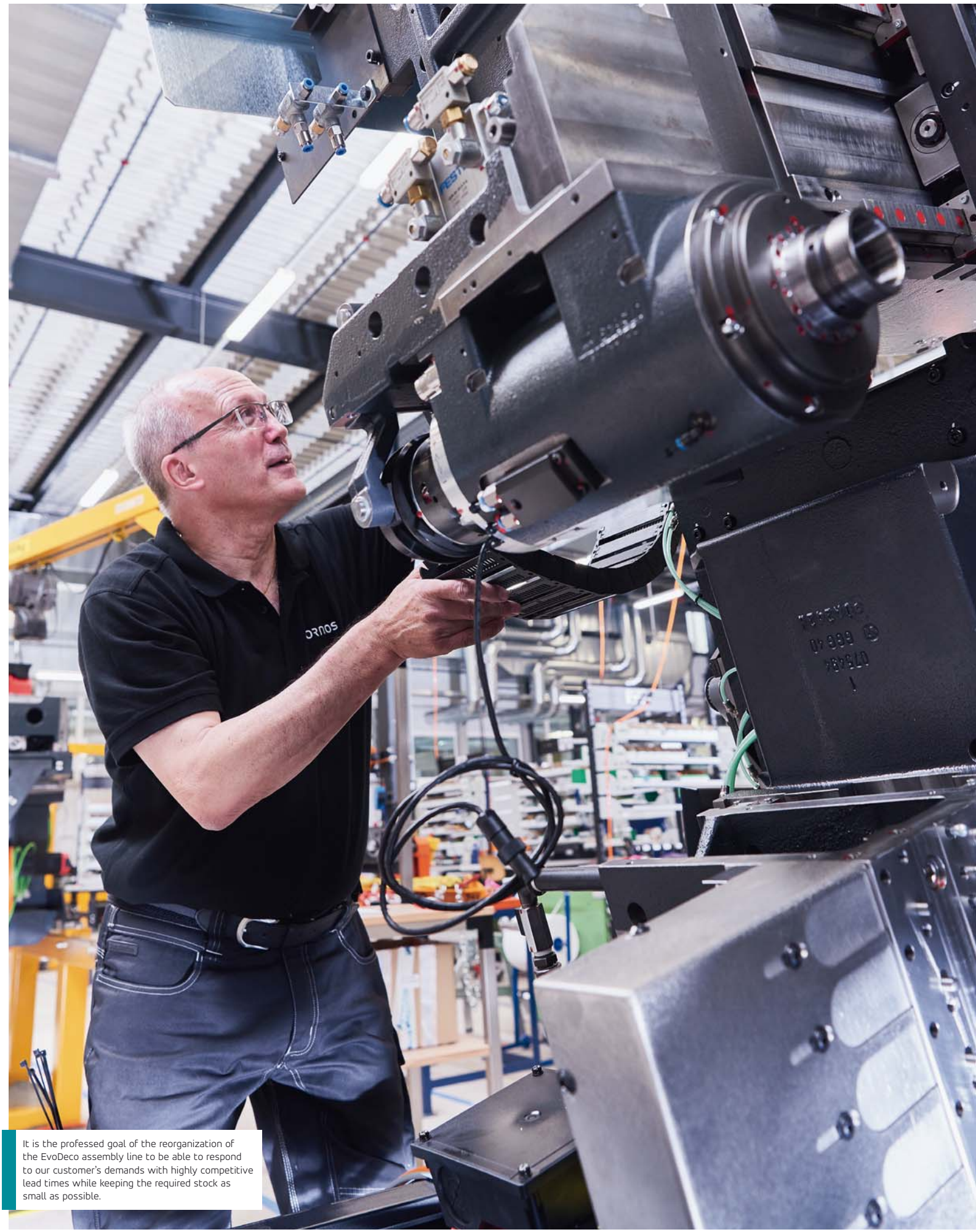

It is the professed goal of the reorganization of the EvoDeco assembly line to be able to respond to our customer's demands with highly competitive lead times while keeping the required stock as small as possible.

Lean manufacturing of the EvoDeco and SwissNano:

Maximum efficiency and responsiveness

In the last edition of the decomagazine, we presented the assembly line in Xi'an (China) where the Swiss DT and CT 20 machines are produced. Now, we would like to introduce the assembly line installed at our headquarters in Moutier (Switzerland).

TORNOS

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We met Mr. Yvan Bucher, Assembly Manager in Moutier and Mr. Luigi Marchese who is responsible for the EvoDeco and SwissNano assembly lines.

Striving for efficiency

The EvoDeco machines are the top models of the Tornos line-up of single-spindle lathes. With their 4 tool systems, the machines are probably the most productive machines on the market. As they are equipped with 10 linear axes, their assembly is a real challenge for those entrusted with this work. In fact, every single EvoDeco consists of several thousand components and more than 1 km of wiring. It goes without saying that every machine must comply with supreme quality standards in order to be able to tackle the diversified machining challenges the machines are faced with in the course of its service life.

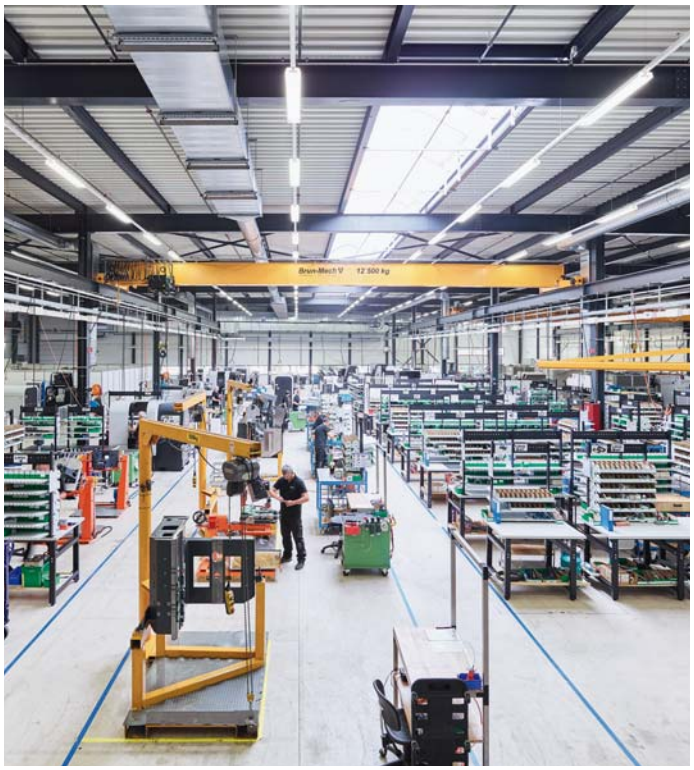
In the past, the EvoDeco machines were not assembled on an assembly line; a set of pre-assembled units and the sub-assemblies were prepared on workbenches and then transported for final assembly to the basic machine using forklift trucks. This process, however, began to reveal its limits, the assembly times

were rather long and this sometimes impaired the responsiveness. Given the usual fluctuations of the incoming orders in the machine tool industry, it was considered essential to increase the flexibility to meet the market needs and with it, the customer requirements. With this in mind, a project to create new assembly line was started two years ago. It was aimed at reducing the machine assembly times and, at the same time enhancing the responsiveness and product quality to better satisfy the customers and fulfill their demands.

A major challenge

"The former assembly system was anything but bad," Yvan Bucher emphasizes, and he adds: "It was not that simple to change it. We wanted to be able to respond to our customer's demands with highly competitive lead times while keeping the required stock as small as possible. Within the framework of this project, one of the major difficulties resulted from the fact that each of our machines can be equipped with dozens of options. This means that there is virtually no identical machine and that the lead times cannot be reduced by make-to-stock production."

After having analyzed the situation, the managers decided to start from scratch and to review the entire project together with the assembly experts. In the end, it's them who have the best knowledge of their work. The assembly process was dissected and reviewed right down to the tiniest detail. Various pre-assembly and assembly stages were defined for the EvoDeco machines. This process did not stop at theory. The assembly-line workers played a key role in the project and in the analysis process. "We wanted to involve them in order to join forces to develop a solution that will work in the field," the manager explains.
Luigi Marchese points out: "Approximately 1 and a half year ago, we started the production line of the EvoDeco 20 and EvoDeco 32 machines. These were the early beginnings of our assembly line: the first feeders (feeding frames) were made of wood. It's the people working with the assembly line that have assembled and optimized their workplace day in and day out. In the course of time and based on the gained experience, the feeders have been optimized resulting in the current final version. Currently, the assembly line is used for the assembly of 4 EvoDeco machine types (10, 16, 20 and 32) while a separate assembly line has been installed for the SwissNano range. The latter assembly line was added to the EvoDeco assembly line in order to focus activities. It is based on the same principles that are adopted for the EvoDeco machines."



As soon as the assembly of a machine is started, the supply chain is automatically initiated and all parts must be dispatched within 48 hours. Behind each feeder, there is a pre-assembly station where the sub-assemblies are assembled to make sure they are available on the assembly line at the right time. On this assembly line, it's the machine that is moving. It all starts with the basic casting that is complemented until the end of the line. Little by little, the components required for the assembly of the machine are added at 6 assembly stations. The counter-spindle carriage, various sub-assemblies constituting the gang tool posts and their guideways, the main spindle as well as the counter spindle and the guards are fitted to the cast machine base. At the end of the line, the top and bottom covers are united to finish the machine. Subsequently, the machine is powered up and the CNC unit is provided with the final parameters. This is followed by 50 hours of trial running, the geometrical inspection and finally, the production of a test piece to make sure the machine exhibits the requested accuracy level and repeatability. At

the completion of the assembly stages, the machine is ready for shipment; depending on the wishes and requirements of the end user, the machine can subsequently be equipped with additional peripherals.

"Our goal was to achieve the assembly of the machine in 6 days; today, the assembly takes a bit more than 7 days," Yvan Bucher reveals to us. He adds: "That means we are very close to our goal. Each of our colleagues has to report the progress status of his work in a follow-up table on a day-to-day basis and any delay must be commented." For every phase, a hypothetical period of 7 hours and 30 minutes is programmed, which permits a clear overview of the status of the production progress and also enables any process problems to be detected immediately. "We can identify at a glance where we have to improve. We have also been adopting a quality warning system; should a problem arise, we report it to the 'quality gate'. If it is a major incident, we stop the assembly line. Every morning, we review any quality problems that have occurred. They are solved by our colleagues who are responsible for the product's life cycle," Yvan Bucher explains.

In practice, the new organization has enabled Tornos to reduce the time required for the assembly of one machine (lead time) by the factor 3 and at the same time, to shorten the time of required manpower by more than 30%. As another benefit, phase definition and synchronization has been realized by assembly specialists. The training of new colleagues on the assembly line is considerably simplified since the process has been conceived based upon and for the production. Production can thus be increased in no time while the risk of inadequate quality is significantly reduced.

With its lean assembly processes for the SwissNano and EvoDeco machines, Tornos can respond promptly and efficiently to varying market requirements. "You are invited to discover our new assembly line when you make your next visit to Moutier. We are looking forward to it," our two interlocutors conclude.

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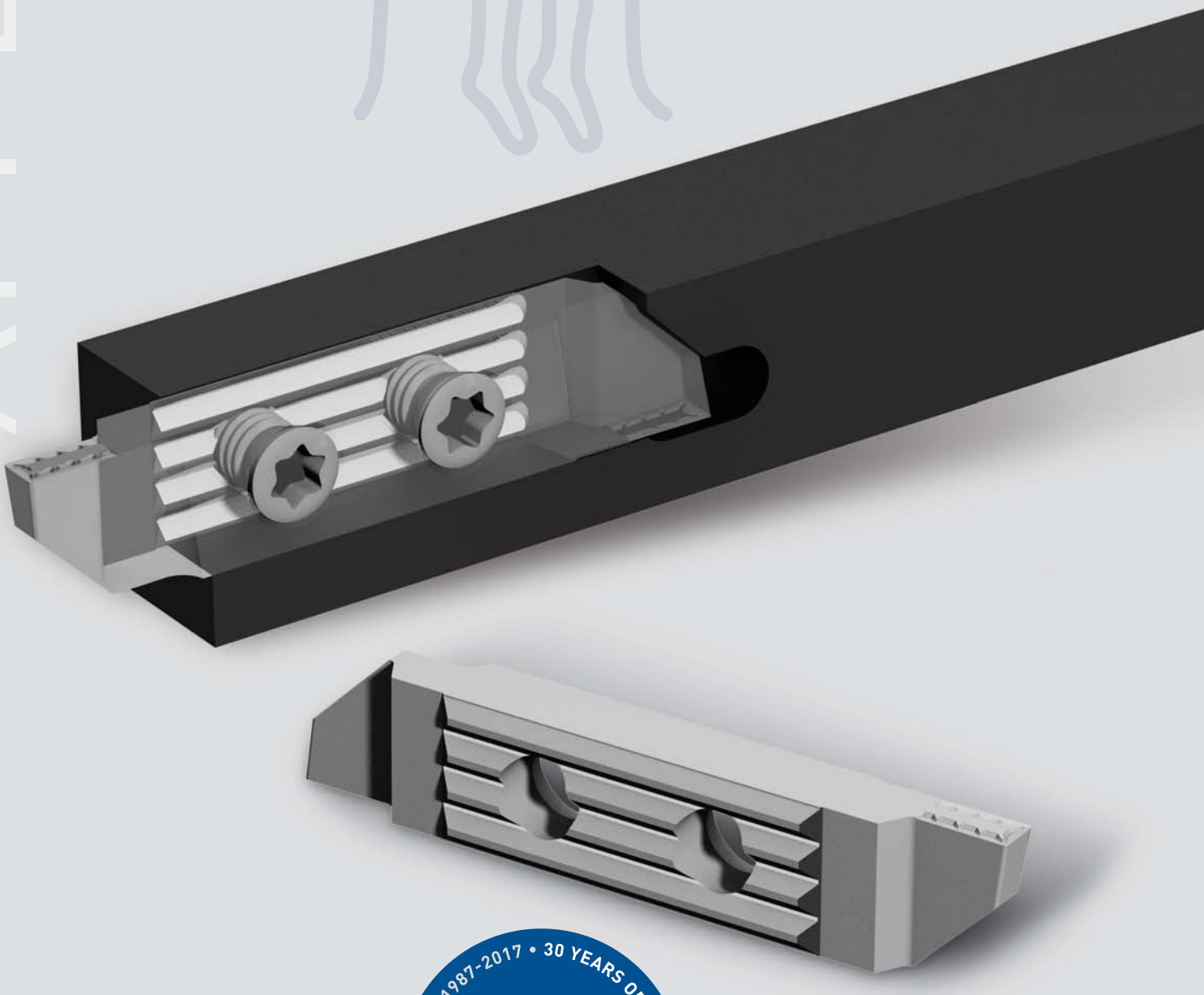
SWISS TOOLING



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SwissDECO 36

Impressive down to the tiniest detail and imposing as an entity, the new Tornos SwissDECO 36 is way more than a cluster of cutting-edge technologies brought to perfection. It represents the experience and the ingenuity of the Tornos engineers. This ultra-performance machine is able to machine bar stock with diameters up to 36 mm and features a 12-position turret that enables the most complex workpieces in the market to be machined. Visit our booth D15 in hall 17 at EMO in Hanover and discover launch of the SwissDECO 36.

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Performance at its best

SwissDECO 36

We keep you turning