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93 03-2020 ENGLISH

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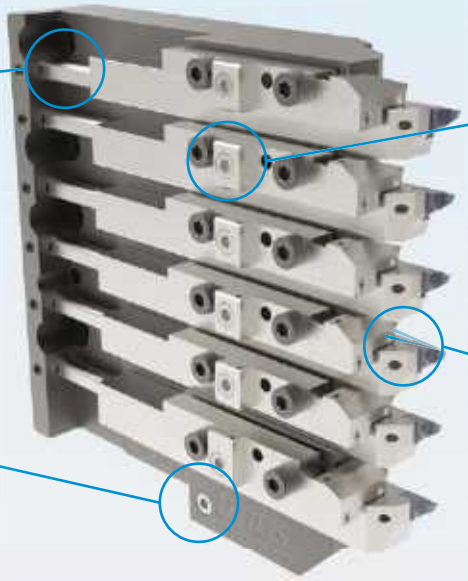
INNOVATION FOR SwissNano7

Flexible tool stop pin



Flow controller on the shim

Several coolant connections on the plate

Two coolant outlets on the front of the clamping shim

TOOL PLATE WITH INTEGRATED COOLING

- **The cooling is led directly to the cutting edge through the tool plate and the clamping shim.**
- **A wide range of connecting options make it possible to have a direct connection to the coolant unit.**
- **The omission of countless externally attached coolant connections which are often extremely disruptive provides more space in the machine room and unrestricted access to the tools.**
- **Adjustable stop pins which are integrated in the tool plate ensure that tool changes take place quickly and accurately.**
- **A flow controller on the clamping shim allows you to control and switch off the cooling altogether specifically for each individual tool.**

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"The CAAJ grants the apprentices the time required to learn and ask questions. They progress in a structure similar to that of a company and can familiarize themselves with certain processes."

Danielle Ackermann, Director of the CAAJ

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SUMMARY

"Technological innovation is indispensable to remain competitive and it must be systematically associated with return on investment for our customers."

Olivier Rammelaere Market Intelligence Manager, Tornos

New technologies – a source of opportunities and innovation for Tornos

Olivier Rammelaere Market Intelligence Manager, Tornos

The Tornos staff is constantly attentive to the market needs and to industrial trends instead of simply concentrating on mere manufacturing. From a certain level of industrial maturity, each new technology offers Tornos the opportunity to advance its products and services or even presents new challenges that require us to offer the most effective machining solution. Industry 4.0, the expansion of electromobility or even the 5G revolution – these are some examples of technologies that call our achievements into question every day but also offer us a broad spectrum of innovative potential and opportunities.

Technological innovation is indispensable to remain competitive and it must be systematically associated with return on investment for our customers. For them, technological innovation must also be acceptable and usable. In the current industrial context, the expectations are high as regards flexibility and ease of use.

Recent events such as the propagation of Covid-19 and the geopolitical tensions between China and the United States have significant effects on the evolution of all the markets in which our customers operate. Many of them invest in our products without knowing what kind of workpieces they will have to produce in 2 or 3 years from now. Our products and services must enable them to progress in this mood of uncertainty.

The lack of skilled human resources is observed at the international level with increasing employee turnover, the shortage of talents and the growing competition is forcing us to offer products whose control and operation is easy and fast to learn. In that respect, the IoT and artificial intelligence (AI) technologies open new possibilities to facilitate the use of the product, its monitoring and the decision-making process by the staff because of production optimization. Programming, operation and maintenance of our products have been made easier with each product generation. The idea of "smart machines" will make more sense with increased operational autonomy and less burden for the staff during the production process.

Automation is an essential development. The increasing propagation of robotic solutions, the increasing pressure on the cost of the parts produced and the demand for an ever-higher quality level make our customers automate their means of production. Since the 2000s, Tornos has incorporated its automation solutions and proposed various solutions tailored to the expectations of our customers. From the robot cell up to pneumatic actuators, there are concepts adapted to and suitable for each production organization. Here again, our customers justifiably expect maximum flexibility at an affordable price since they are faced with a large variety of workpiece shapes, storage systems, "post-treatments" or even with the necessity to incorporate a measuring system that enables closed-loop machine compensation.

The application of the benefits associated with additive manufacturing is still at its early stages but, once again, calls our habits – from product development to spare parts delivery and after-sales service – into question. Tornos already uses this manufacturing method to shorten the manufacture of prototype

parts and to produce certain serial parts for our machines... But this is just the beginning! Based on the integration of multiple functionalities in the same component and the high flexibility of this manufacturing solution, we can offer products of better cost-effectiveness while guaranteeing better availability of spare parts.

As a machine tool manufacturer, we have to offer climate-friendly technologies that come up to the increasing requirements. This growing trend, whose importance is probably influenced by political initiatives, is already taken into account during the development and use of our machines. Our customers benefit from this trend through a line-up of energy-saving solutions (programmable pre-heating function, Eco mode, etc.) and, last but not least, our energy-efficient products such as the SwissNano series.

Of course, new technologies that are used by customers have an impact on the definition of our machines. We largely observe the "incremental" innovations for all our segments to become aware of when we must not only push but go outside the envelope with our products. In new markets such as electromobility, however, even more, radical innovations are taking place.

As far as 5G technology is concerned, more precise connectors and a better conductivity for the exchange of signals of higher frequency than for

former network generations are required. On the other hand, our customers from the field of microtechnology are bringing their manufacturing processes to perfection to increase their productivity and surface finish. For this purpose, they are using new lead-free materials such as EcoBrass that require an in-depth review of the cutting conditions.

The automobile sector also presents us with challenges at several levels: on the one hand, downsizing and the reduction of the consumption of internal combustion engines necessitates higher injection pressures and thus the use of materials with improved mechanical characteristics. Such materials, however, are more difficult to machine and machining must be realized with more and more demanding tolerances and reject rates.

On the other hand, electromobility has boosted the production of high-voltage connectors and the demand for gearing elements. Against this backdrop, the integration of gear cutting processes such as gear hobbing or gear skiving has become indispensable for a portion of our Swiss-type lathes range. Furthermore, the creation of a new targeted production chain brings along optimum production flows and requires not only the communication with the production staff but also among the machines: Tornos provides our customers with a full range of solutions accessible through the Connectivity Pack and based on the UMATI communication protocol. And what about hydrogen propulsion systems? Many of you have already business relationships with purchasers from this field and should take into account the production increase of this technology.

Without claiming to be exhaustive, I want to finally mention the medical sector, a sector that is also "shaken up" by various trends. The growing demand by emerging countries, the ageing of the population and the increase in obesity require the optimization of the production cost to enhance the accessibility to appropriate care. Our customers want us to develop solutions with better cost-effectiveness. Still, to facilitate the access to medical care, surgical procedures are shortened thanks to the definition of less invasive or customized products: new shapes of surgical instruments to reduce injuries, new materials that facilitate osseointegration or even "customized" parts that perfectly match and adapt to the physical characteristics of the patient. In the future, robotic surgical assistants will play a major role for all Medtech leaders: they enable the surgeons to realize less-invasive surgery and guide their hands to precisely reach zones that are difficult to operate. The entire range of Tornos products covers these requirements in the best possible manner both in terms of the type of workpieces to be manufactured and of the production quantity. Tornos products offer similar optimization and connectivity possibilities to ensure that you can tap the full potential from them.

The first sliding headstock lathes saw the light of day in 1880; their evolution, however, is still in full swing and you can count on us when it comes to satisfying your current and future demands!

Olivier Rammelaere
Market Intelligence Manager, Tornos

The deployment of 5G requires new infrastructure to support the high-frequency signal for sending data.

Are you prepared to tackle the challenges of 5G?

We are all 'connected' and in a world where connectivity and technology are increasing and equally important, it has become more prominent in the workplace. Regardless of production equipment or industry sector, the 'factory of the future' is here.

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Innovation is furthered by technology and this is spreading around the world at astounding speed. A key engine for this phenomenon is mobile telephony: its ongoing development has brought fundamental changes in society. The Internet of Things or IoT, brings a vast network of physical devices and other equipment with incorporated electronic components, software, sensors, actuators and connectivity into our lives. The pace is relentless since 2018, when the first deployments of large-scale 5G networks and mobile networks arrived. By 2023, there will be more than 3,5 billion 5G subscribers, which will probably accelerate the transformation rate even further.

The eagerly awaited deployment of 5G started in the last few months of 2018, especially in the United States, the country that is the pioneer in this field. In Asia, 5G has already been introduced in South Korea, Japan and China; and in Europe, the first 5G subscriptions were also concluded just recently. This development towards a technology that, among other things, allows a significant increase of the data transmission speed requires enormous investment by the operators. Although 5G deployment may be complex for the mobile operators in the short run, the market

"The SwissNano, Swiss GT and Swiss DT machines are the ideal partners for anyone who wants to produce male or female contacts or even contactor bodies."

demand and the related opportunities will accelerate the planned deployment throughout the world. Tornos has long been prepared to face the sudden increase in demand by offering machines that are capable of producing connectors and other devices required for this technology.

"5G technology requires a new infrastructure since it needs a signal of higher frequency for data transmission. Essentially, the connectors have not changed but they certainly had to evolve both in terms of precision and material to be able to enhance their conductivity. The necessity to reduce signal loss involves high-precision connections and machined connectors best meet these expectations. Specific parts such as the contacts already have diameters requiring tolerances down to the micrometer range. In line with these requirements, Tornos offers a full range of machines suitable for the complexity of the workpieces to be produced by the customer," Olivier Rammelaere, Intelligent Market Manager at Tornos, explains.

He adds: "5G antennas and receivers have a shorter range than the existing communication networks. This means that more components are needed than for the previous networks. In addition to the new equipment, this infrastructure needs power supply systems and thus paves the way for new applications that are based on the use of sensors. This situation calls for an increased production of all components involved and implies that the customer has to buy new machines to increase his production volumes but also to improve his efficiency."

A major shift – technological change and digital transformation

From the outset, it has been unthinkable for Tornos not to participate in this technological revolution. The Tornos R&D engineers began quite early on to show an interest in the emergence of this revolution and in the ongoing digital transformation. In this way, the Industrial Internet of Things (IIoT) is turning global manufacturing upside down. Based on a network of devices interconnected by communication technologies that can monitor, collect, exchange, analyze and supply new valuable data, the IIoT is supporting the emergence of Industry 4.0; the latter starts the fourth industrial revolution. This promotes the concept of Smart Factories that shall

enable industrial companies to come to more intelligent economical decisions in less time.

Even now, Tornos is at the very heart of this exciting chapter that is full of challenges for the value chain of the production of electronic components. Characterized by technological innovation and sustained global growth, the electronics industry is supplying virtually all other industries through a complex and globally linked supply chain. Despite the opportunities resulting from the high demand, the manufacturers of electronic components are facing real challenges: the necessity to meet the demand with the highest level of quality and efficiency, the short innovation cycles and service lives of the products, the control of costs and a rapid return on investment for the machines.

Tornos has always taken a favorable view of any technological evolution and progress. Far from only following the technological progress, the company aspires to always be at the forefront of innovation and wants to provide solutions that are even more amazing, even better tailored to the needs and even more efficient.

Automation, miniaturization and connectivity are ubiquitous in everyday life for any of us, from plugging our electrical appliances into wall sockets to the connection of various computer components and consumer electronics. Just like the automobile and medical industries, the electronics sector benefits from the technological advances of bar turning. For the customers, the trend towards customization of each connector, the standardization of mass products and the emerging needs in terms of miniaturization are daily challenges that lead to highly specific technical requirements. At the same time, the manufacturers of electronic components see themselves forced to accelerate large-scale production and, at the same time, reduce the cost. The connecting business requires highly automated industrial means to realize the large-scale production of components of an ever-higher level of sophistication.

Fiber optics with speed of light

An optical fiber is a fiber whose very fine core is made of glass or plastic. The optical fiber can transmit light and is used for fiberoptic endoscopy, lighting purposes or the transmission of digital data. It offers data transmission rates that are much higher than those of coaxial cables and can support broadband networks which are used for television, telephony, video conferencing or the transmission of computer data. The principle of fiber optics can date back to the beginnings of the 20th century, but it wasn't until 1970 that a fiber usable for telecommunication purposes was developed – in the laboratories of the American company Corning Glass Works (today Corning Incorporated). This technology requires connection solutions for which Tornos provides optimum machining solutions.

The optical fiber, that is surrounded by a protective sheath, can be used to transmit light over long distances of several hundreds or even thousands of kilometers. The light signal, that is encoded through a variation of the intensity, can transmit large data volumes. Thanks to data communication over very long distances and to transmission rates previously considered impossible, optical fibers are one of the key elements of the revolution in the field of telecommunications. Their characteristics are also used

for sensor technology (temperature, pressures sensors, etc.), imaging applications and lighting purposes.

For Tornos, fiber optics provide another opportunity to even further advance technology integration in its machines and thus enhance productivity while reducing the cost of parts. The SwissNano, Swiss GT and Swiss DT machines are the ideal partners for anyone who wants to produce male or female contacts or even contactor bodies. With these machines, Tornos expanded its product portfolio to cover a wide range of needs but also to promote the advanced integration of technologies and thus to enable you to reduce the different stages of product manufacturing. Furthermore, the MultiSwiss offers unrivalled productivity for the production of PCB connectors and certain connector bodies.

Tornos has the expertise required to analyze the market requirements and the actual expectations of the developers and manufacturers. This enables Tornos to offer the most comprehensive and advanced solutions in order to continually enhance quality, productivity, lead times, return on investment and overall profitability for the customers.

This makes clear that behind every device or item of daily use, there is an electronic application and behind every electronic application, there certainly is a Tornos solution. That's why Tornos is selected as the first address by manufacturers of electronic components from all over the world. This applies to companies that are in search of automatic single-spindle and multispindle lathes, micro-milling solutions and software as well as world-class service.

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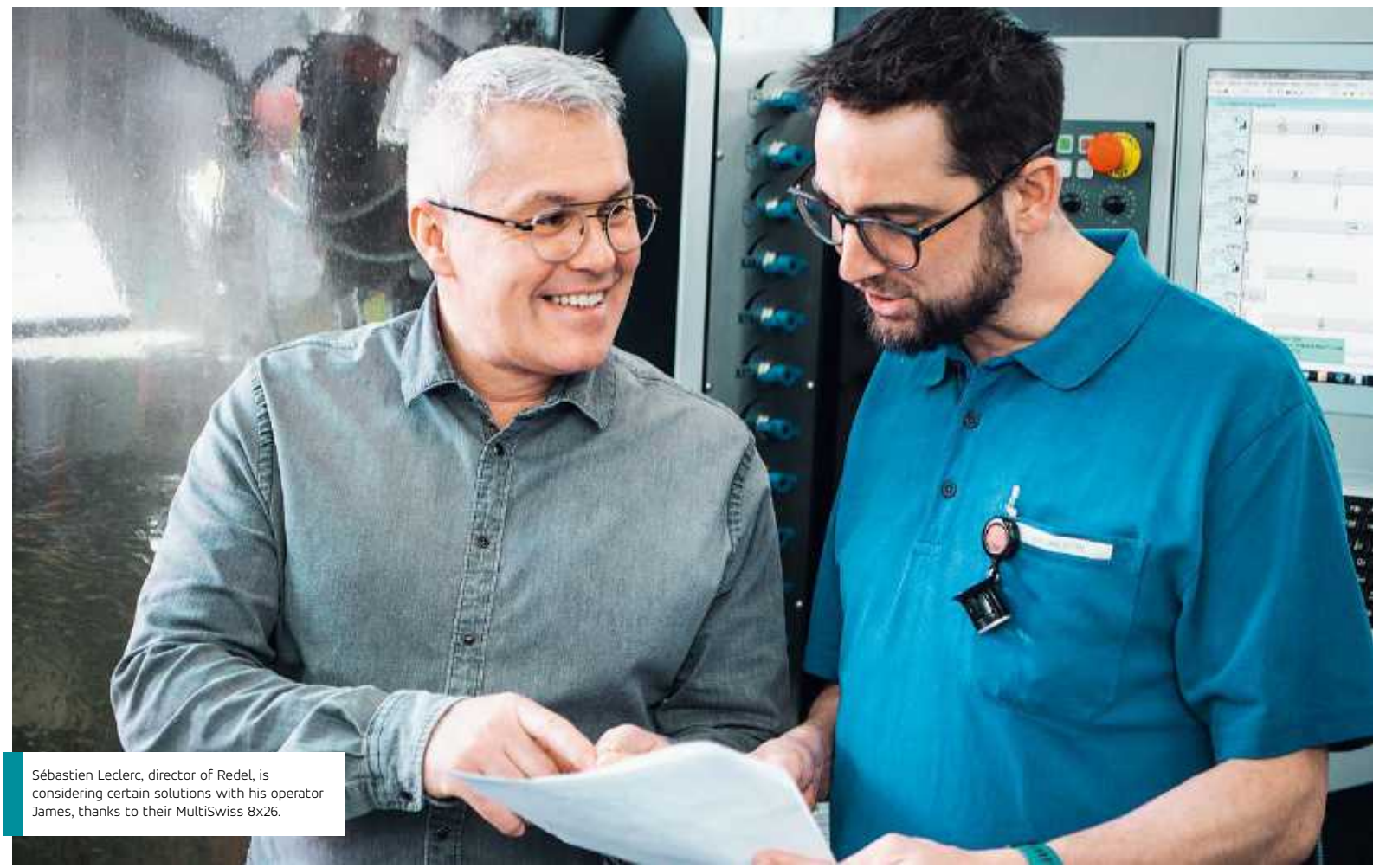

Sébastien Leclerc, director of Redel, is considering certain solutions with his operator James, thanks to their MultiSwiss 8x26.

REDEL –

at the forefront of innovation in the

connectivity business

As a thriving business based in the Jura Mountains of the canton of Vaud, Redel is one of the brands within the LEMO Group. At its plant in Sainte-Croix, which has been operating at full capacity, plastic circular connectors are manufactured, primarily for the medical industry. The Sainte-Croix site also has established subcontracting activities for its parent company, which includes bar turning operations of hard materials such as steel, stainless steel and titanium – it is here that Tornos steps into the equation.

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Established in Sainte-Croix in 1986, Redel is a subsidiary of the LEMO Group, a world leader in the connectivity business with more than 93,000 customers in more than 80 countries. While LEMO supplies all the high-tech industries and research centers such as CERN in Geneva, Redel is a specialist in plastic connectors, especially for the medical sector. Redel is also engaged in the design of plastic components and also the injection molds used for such components. "The medical sector accounts for almost 30% of the sales," confirms Redel's Managing Director Sébastien Leclerc. "The major part of the connectors manufactured by us for this segment can be sterilized, whereas other components are disposable parts used for surgery," he adds.

Connectors play a key role

Redel connectors ensure reliable high-quality connections using a push-pull latching system and once the connector has been latched, the connection can be disconnected by pulling the outer release sleeve. These connectors are used to conduct electrical current or fluids (mainly water and, to be more precise, sterile water when they are used for the medical industry) but can also be designed as optical fiber connectors. Even if Redel has gained a solid reputation based on its plastic connectors, the company also produces metal connectors. The size of these connectors is between 5 and 70 mm.

Bar turning – a process highly esteemed by Redel

The hard material machining is completed on two Tornos MultiSwiss machines and the core of the plant devours the parts machined on the Tornos centres, which means they run 23 hours a day and 6 days a week. "At the moment, we are working in three 8-hour-shifts," Sébastien Leclerc explains. "Our machines are turning around the clock to cope with the high demand of this booming sector. Beyond that, most of our employees are working on Saturday mornings. The machines that are loaded on Saturday around midday usually run the unmanned operation until Sunday morning. Therefore, break times are very short."

The output of these machines is impressing but still does not entirely meet the constantly growing customer demand. "We are rapidly growing, but we must acknowledge that we are fully saturated," Sébastien Leclerc concludes. "For this reason, we have decided to expand our production site, even if our plant currently has a floor area of 5250 m², this is far from being sufficient," the Managing Director explains.

Now, Redel wants to benefit from the opportunities offered by the company's location at the heart of the Vaud Jura region to expand its current production area by 1780 m². This will enable Redel to acquire further machines because the LEMO Group is generous in this matter. Every year, they invest a minimum of 4% of their sales – and the sales amounted to more than 300 million Swiss francs last year. This provides the opportunity to complement the machine pool with other Tornos machines and thus enables other components to be turned from the bar. One MultiSwiss machine has already been installed at Lemo.

Sébastien Leclerc and his machine operator James are full of praise for the MultiSwiss: "Our MultiSwiss 8x26 can machine 15 workpieces per minute. This is a record!" Once having been set up, the machines can machine parts boasting a level of complexity and precision that previously could not be achieved. In this way, the machine cannot only manufacture one of the connector half-shells but also succeeds in producing a full shell and performing center machining tasks on it. On the other hand, the MultiSwiss 6x14 machine can be used to manufacture the second part of the shell's latching system. To a certain extent, mirror image machining tasks are used to finally obtain a perfectly machined full shell that forms the central part of the finished connector.

"Thanks to the workshop's two MultiSwiss machines, we might even say the wheel has come full circle and the connector is correctly fitted. In 2017, LEMO launched a commercial strategy that may be defined as aggressive", Sébastien Leclerc explains with due pride. "By 2025, we want to obtain a 50% growth in all sectors and, if I may say so, we are on the right track," Sébastien Leclerc rejoices.

A growth market sailing before the wind

This growth is also reflected in the number of employees that has increased from 120 to 145 in a very short time. The first two months of 2020 have already seen the employment of 7 new employees and the Managing Director does not intend to stop there. Redel is in permanent search of new qualified employees. And here lies the problem, as this sector, just as all other industrial sectors, is suffering from a severe lack of skilled workforce.

"We are trying to cope with this problem as best as we can," describes Sébastien Leclerc. Redel also trains apprentices, normally as manufacturing mechanics. However, even if Redel advocates a human-oriented approach, this model is undergoing a radical change. "Since we no longer offer in-house assembly of the finished products, our machines perform the turning operations with minimum staff," declares

Success Story Redel

youtube.com/watch?v=QUn6mE5oP6Q&t=5s

“Our MultiSwiss 8x26 can machine 15 workpieces per minute. This is a record!”

the Site Manager. “We certainly ensure the complete professional training of our employees,” Sébastien Leclerc adds. “After all, they are the ones who, after extensive one-year training, undertake programming and machine set-up as well as the control of highly complex production processes.”

For this reason, the manual assembly has already been outsourced to Hungary in 2016 to obtain space for the installation of new technology. Nevertheless, 85% of the basic products offered by the LEMO Group are still produced in Switzerland and 98% of them are intended for export from one of the three company sites in Sainte-Croix, Ecublens and Delémont. So, Redel is permanently trying to obtain a balance between automation and operator autonomy, between human endeavours and cost reduction.

With the expansion of the shop floor area by 1780 m² in 2020, the plant in Sainte-Croix, that is currently equipped with more than 80 machines, seems to have good prospects in the connectivity business. But even with lacking space in its premises, the connectivity specialist succeeded in increasing its production volume by 30% in less than three years. The new premises will, therefore, most probably allow for a further increase in production under optimum conditions and thus enable Redel to respond to the requirements of a rapidly growing sector that is characterized by constant innovation.

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HAROLD HABEGGER

Do you want to reduce your cycle times without too much effort?

Use TISIS to turbocharge your productivity!

Tornos now offers its customers a new machining process that to date is offered with two kinds of model programs, the 'Standard' model and the 'Dual feeding' model. From now on, there will be a third model program available: The Turbo model.

TORNOS

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How is this possible?

The 'Standard' model program is a program that enables chucked parts to be machined in a most simple and safe manner. The 'Turbo' model program makes the machining of chucked parts very easy. However, thanks to an innovative process, this program guarantees optimum cycle times.

Let's look at some specific examples:

1. *Swiss GT 26: reduction by 7.1 seconds (as against 14.1 sec)*
2. *CT 20: reduction by 11 seconds (as against 18 sec)*
3. *SwissNano: reduction by 7.6 seconds (as against 11.8 sec)*

These time savings are due to several factors such as:

- *new scheduling of the sequences*
- *reduced downtime*

- *synchronized positioning of bar and counter-spindle at the time the workpiece is picked up*
- *possibility of synchronizing the workpiece cutting process and the feed of the next workpiece*
- *optimization of the counter-spindle positioning movements for workpiece pickup*
- *optimization of the counter-spindle retraction movements after workpiece pickup*

This process is available for all Tornos machines running with the latest generation of TISIS. It can be used by simply updating the NC software on your machines and via the TISIS software on your computer.

The Turbo process in detail:
To use this new process, simply use the Turbo model program that comprises new macros.
Four new macros enable you to use this model:

- *G805 allows the automatic configuration of your process.*
- *G940 enables you to prepare the machine for workpiece pickup by the counter-spindle.*
- *G941 enables you to cut the workpiece, feed the next workpiece and retract the counter-spindle.*
- *G942 allows fast management of program loops.*

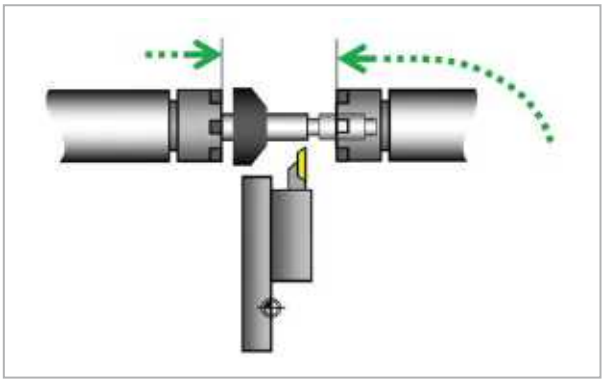
One of the essential differences between the 'Turbo' model and the 'Standard' program model lies in the fact that a new workpiece is fed at the end of the loop and not at the beginning of the loop. This opens up a host of possibilities for reducing your cycle times. The model program comprises various options that permit the automation of the optimum movements without you having to worry about them.

Another advantage is the sequencing of workpiece extraction from the counter-spindle is enhanced. The process has been designed to calculate a maximum number of data before the loop is started in the course of program initialization. This has the advantage that the values are only calculated once, and downtimes are reduced.

Now, let's look at these improvements in detail:

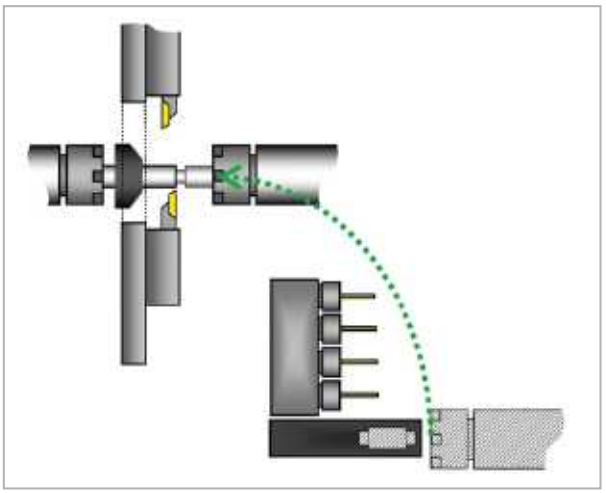
Synchronized movements for workpiece pickup

In a standard model, it is necessary to position the spindle (Z1) at the workpiece pickup position, then recalculate the zero offset (G915) for workpiece pickup and finally clamp the workpiece in the counter-spindle (Z4).
With the macros used for the operation of the 'Turbo' model (G940), the spindle and counter-spindle positioning movements can be synchronized if required (this depends on the duration of the machining operations in the program).



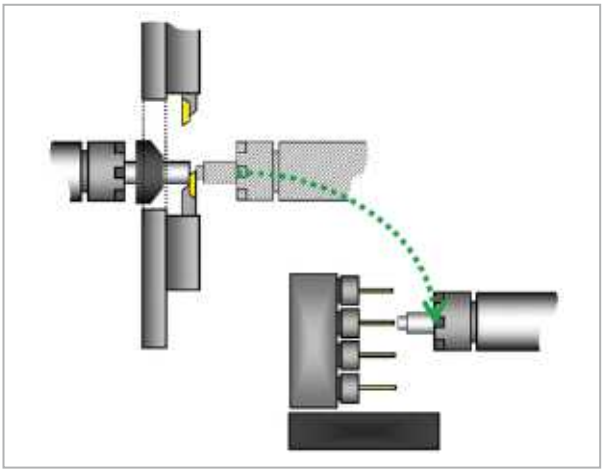
The approach of the counter-spindle for workpiece pickup

The process is further improved in terms of reducing non-productive movements of the counter-spindle. Once having extracted the workpiece, the counter-spindle moves directly to the workpiece pickup position under circular interpolation (G940) and, in doing so, bypasses the back-machining tool block. Moreover, the rotational speed of the counter-spindle automatically adapts during the movement.



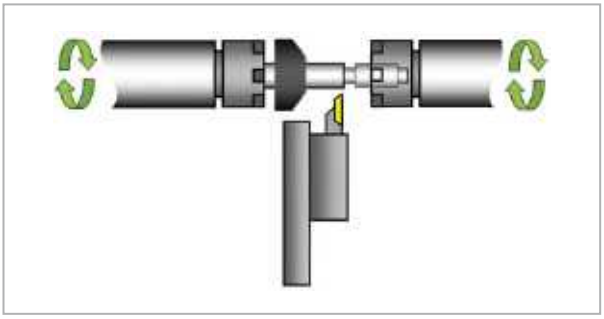
Retraction of the counter-spindle after workpiece pickup

Once the workpiece cutting sequence has been finished, the counter-spindle moves back to a position pre-defined by the user (G805) under circular interpolation (G941).
It is also possible to define a new speed for the counter-spindle (G805) to make the counter-spindle adapt its speed during the retraction movement.



Synchronization of counter-spindle and main-spindle speeds

By default, speed synchronization between main spindle and counter-spindle is carried out (M417) before the workpiece is picked up. This is faster than phased synchronization (M418).
Phase synchronization is used only when a workpiece of irregular shape must be picked up after having been oriented first; this is enabled by the appropriate parameter (G805).

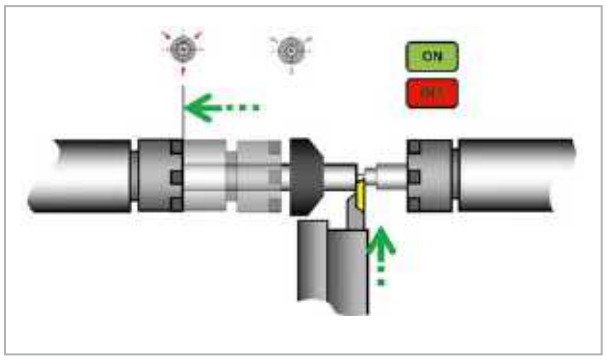


Tool breakage monitoring

As an additional measure to achieve optimum cycle times, the tool breakage monitoring function is always disabled during the retraction of the counter spindle. If you think it necessary to use the tool breakage monitoring function, it can certainly be enabled (G805).

Possibility of synchronizing the workpiece cutting process and the feed of the next workpiece

If desired, this new process also enables the feed of the next workpiece while the current workpiece is being machined (G941). In most cases, workpiece feeding will not cause any downtime. This feat is enabled by the fact that the counter-spindle can drive the bar independently while the main spindle collet is unclamped to feed the workpiece.



High-performance mode

In the 'Turbo' mode, the high-performance mode (G805) can be enabled as well. With this mode being active, the cycle is directly looped for each channel. This means the machine does not wait for the slowest channel. In this way, downtime at the end of the machining cycle is avoided and the cycle time is reduced.

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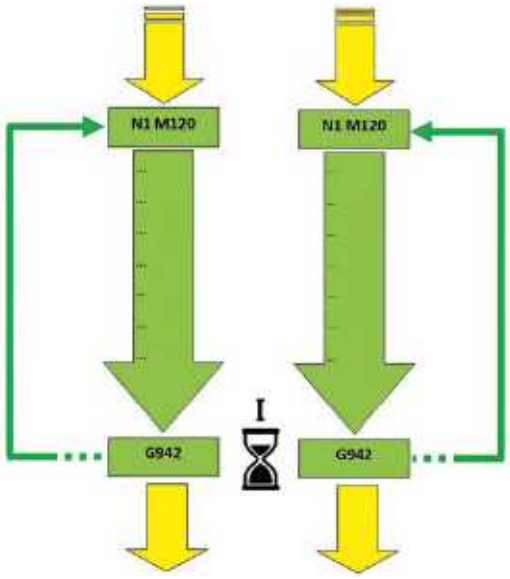

Suzhou Zhenyi has acquired a total of nine SwissNano machines, each running 24 hours a day.

Stabilized mass production of implant and interventional micro-components

Established in 2010, Suzhou Zhenyi Precision Instrument Co., Ltd. is a professional manufacturer of medical devices in China that is dedicated to the production of implant and interventional micro-components and medical device assemblies.

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Unlike its domestic competitors, which started their businesses with the machining of parts of several millimeters, Suzhou Zhenyi anticipated the great market demand for small parts and focused from the outset on the production of micro-components under 1 millimeter.

Great cooperation takes time

In 2014, Suzhou Zhenyi suddenly came under huge production pressure as its delivery times, which had been enough until that point had become instantly lengthened with a customer's pending relocation of his factory.

Meng Dehui, the manager of Zhenyi Equipment and Tooling, said that the customer required a slot of 0.4 mm on a 0.5 mm round rod, and only 0.04 mm-0.05 mm on one side. What was the problem? "The thickness of a human hair is 0.08 mm, which means that it is the equivalent to engraving a hair to make this part. It really completely exceeded our conventional possibilities."

General Manager Wang Jinbo of Zhenyi fretted about the situation at that moment. "We realized that there were very few resources available in China. We also

contacted some machine tool companies from Japan, Germany and America for trial machining, but the results were not that ideal." Wang Jinbo then learned about Tornos - a Swiss machine tool company that supplies heavy-duty turning machine tools that are suitable for the processing of micro-components. These machines are highly matched to the degree of the requirements of Zhenyi. Therefore, Wang Jinbo deliberately went to Tornos for further information.

Huang Xinchun, Regional Sales Manager of Tornos Trading (Shanghai) Co., Ltd. recalled that it was just the time of the first SwissNano coming to China. "We trial-machined parts for Zhenyi on the Nano, and the machined part quality was very satisfying." Wang Jinbo immediately made the decision and purchased the SwissNano. But that SwissNano had to be demonstrated at exhibitions in China, as it was the only SwissNano machine in China at that moment.

"So, that machine was very busy at that time! It was shown on many exhibitions in Guangzhou and in Shanghai now and then. Only in the time between the shows, the machine was taken to the factory for production. But we still delivered the first batch on time even under such difficult circumstances. The success of this technology also laid the foundation for our continued procurement of Tornos machine tools," said Tang Yong, Deputy General Manager of Zhenyi Management Department.

So far, Zhenyi has purchased a total of nine Tornos SwissNano machines and each machine can keep running continuously for 24 hours a day with less unplanned downtime. The SwissNano has been well received by Zhenyi 's technical staff with its high stability and accuracy along with its consistent high quality.

Customization for the 'hard to machine' materials

It is well known that implant and interventional devices have high requirements regarding the material properties that not only include conventional stainless steels such as 303 and 316, but also nickel-titanium and platinum-iridium alloys. The common problem of these materials is their poor workability, combined with the extremely small size of the parts and the complex and changeable structures, which makes machining extremely difficult.

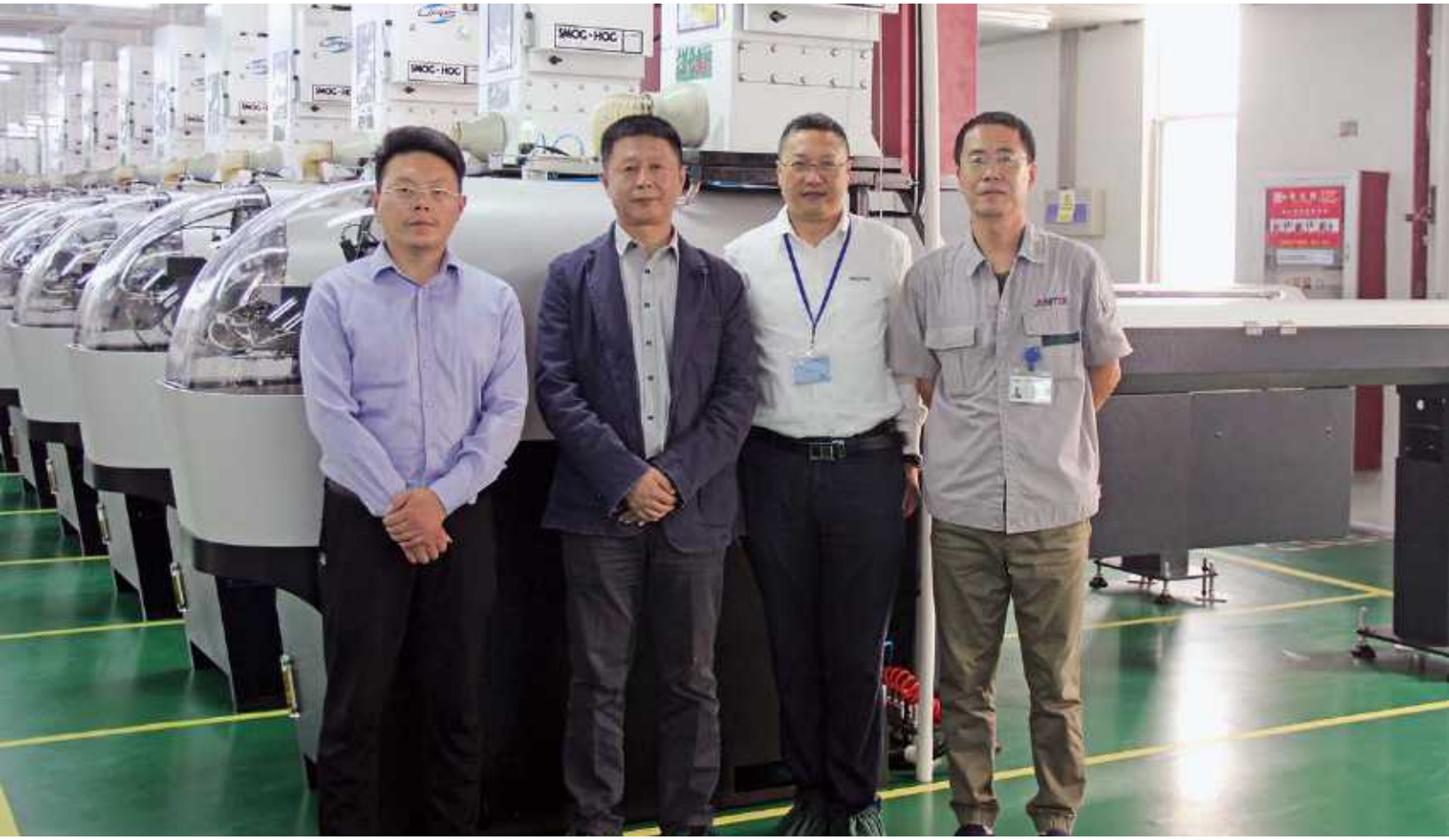
"The success of this technology also laid the foundation for our continued procurement of Tornos machine tools."

The SwissNano can meet all these challenging requirements. Huang Xinchun explained that the SwissNano adopts a symmetrical cast iron structure, which supports the kinematic structure of 6 linear axes and 2 independent tool systems. The back-machining spindle with 3 linear axes enables fine back machining, which makes it easy to perform the turning and drilling, cutting, deburring and rough and finish machining. The machine can offer high value-added machining, such as hobbing, polygon milling, thread milling and internal thread whirling. This is all credit to the short-range thermal cycling and thermal management of the machine, which ensures excellent thermal stability of the machine.

In addition, Tornos offers its customers a large amount of assistance, including a comprehensive spare parts warehouse, modular milling, drilling and threading tools, also an efficient recycling system for replaced spare parts. Additional peripherals are also available such as vacuum extraction of fragile and/or small workpieces, which not only eliminates the problems in precision machining, but also greatly shortens the cycle of part testing machining.

Sincere cooperation for a better future

Many experts believe that it will be a golden decade for the development period of the medical device industry in China in the next 10 years. One reason is that the living standards will further improve, and



people will pay more attention to healthcare. On the other hand, many medical technologies applied through minimally invasive methods will become popular together with the application of robots and AI technology. In Wang Jinbo's opinion, Zhenyi will continue to play a big part in the business of implant and intervention devices. In this field, the two trends of product miniaturization and function integration will determine the future development.

"These two trends will require that our basic equipment not only provides more options, but also that it should become more intelligent and intuitive in terms of process control and monitoring capabilities. In the future we may need our suppliers to provide us with more help," Wang Jinbo said.

In this regard, Tornos' Regional Sales Manager, Mr. Huang Xinchun, fully agreed: "The SwissNano is equipped with our self-developed TISIS software, which can help companies to monitor the status of their machine in real time. This technology monitors the production process, capacity statistics and abnormal machine analysis, which we have already started to implement. Next, we will also help Zhenyi integrate all the machines with TISIS software. In this way, the entire production operation will be smoother, and it will help Zhenyi's manufacturing capabilities continue to increase."

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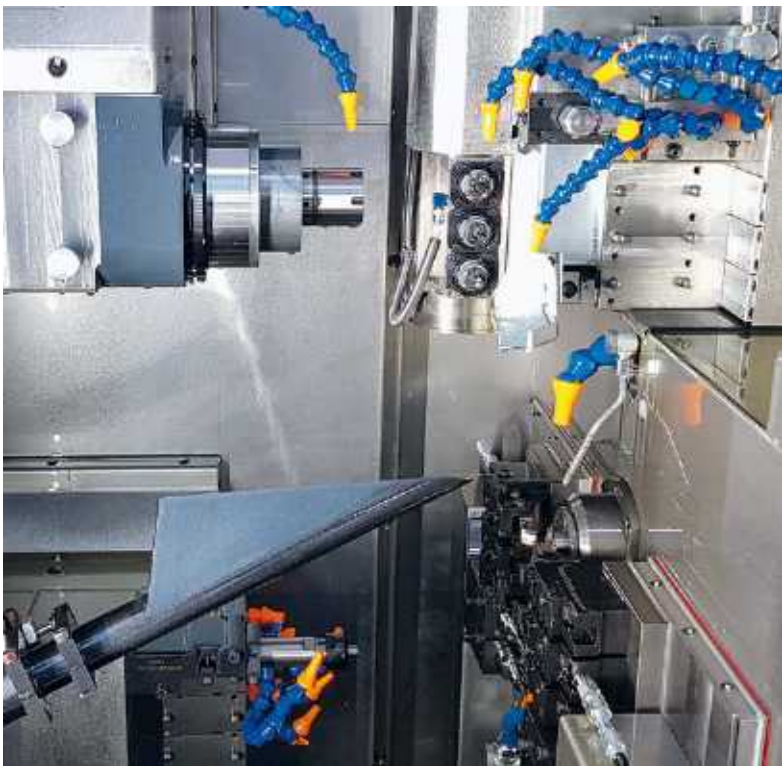

For its first machine, the company Precxis, a member of the Practaris group has relied upon the EvoDECO 16 .

The Pracartis Group relies on Tornos

and the EvoDECO 16

The Pracartis Group headquartered in the French region of Haute-Savoie consists of seven companies, each of them featuring renowned expertise in the design and implementation of comprehensive high-precision machining solutions. The solutions offered include everything from cutting tools and special cutting tools to motorised spindles. Where Precxis is involved, these solutions specifically meet the needs of the medical industry.

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Precxis: specialized in medical instruments

Since 2011, Precxis has been producing CAD/CAM milling burs and cutting tools for the implantology and the orthopedics fields. With its products, the company addresses the issues faced by medical and dental professionals. Precxis quickly rose to the top of its field and has established itself as the No. 1 manufacturer of CAD/CAM milling burs in the French market.

Precxis is certified to ISO:13485 and is duty-bound to perfectly control its value chain. The company is an expert in grinding, gear cutting, sharpening and the entire range of finishing tasks. Just recently, bar turning was added to the value chain in line with the regulation on dual sourcing. For its first lathe, the company opted for Tornos and its EvoDECO 16,

Tornos' top-of-the-range machine. This machine is equipped with a B-axis and can produce highly complex parts. Thanks to the machine's B-axis, Precxis can offer complex tools and instruments that meet any application requirements and challenges.

"Responsiveness and consistent customer orientation, are the features that characterize Precxis best. Against this backdrop, we felt it was important to choose a machine that reflects this customer-oriented approach. And that's exactly what EvoDECO 16 does! The machine is extremely responsive and enables us to work even faster," emphasizes Juliette Chambet, Communication Manager of the Pracartis Group.

"I remember the production of our first tool batches when our customer complained about the excessive sharpness of our tools."

Seven companies at the service of precision

The Pracartis Group comprises seven companies and a high-tech testing and R&D center, all of them committed to a high level of precision

- ***Ham France:*** *designs and produces standard and customized cutting tools.*
- ***Precise France:*** *designs and produces motor spindles boasting ultra-high speed.*
- ***Carbilly:*** *designs and produces cutting solutions.*
- ***Precxis:*** *produces and distributes cutting tools for the medical industry.*
- ***Concept Diamant:*** *specializes in the industrial application of diamond tools.*
- ***SMG:*** *designs and refurbishes grinding machines.*
- ***Electrobroche Concept:*** *specializes in the maintenance of spindles and motor spindles.*

Based on this diversification, the Pracartis Group can supply comprehensive industrial machining solutions – both for turning and milling operations.

Bar turning is just one of several processes, as the realization of an instrument for the medical sector requires extensive know-how. This know-how includes grinding as well as gear cutting and sharpening – but that's not all. Precxis is also proficient in many finishing operations such as laser marking, attachment of colored rings, electro-polishing and anti-corrosion treatment (passivation) that all meet the international standards in force.

Each tool can be marked as desired, with all paints being bio-compatible and resistant to sterilization. The colored ring serves as an indication of the diameter. The color marking of the depth gauge enables the surgeons to check the depth of a hole by means of the visual mark on the gauge. "Each tool is subjected to electro-polishing operations intended to eliminate any machining residues and achieve a smooth and shiny surface finish," Juliette Chambet stresses.

A group-owned research and development center

Precxis benefits from the expertise of the Pracartis Group that is a specialist in the development of cutting tools. The know-how of other group companies has been of great help for the establishment of the company Precxis. "I remember the production of our first tool batches when our customer complained about the excessive sharpness of our tools."

Precxis, however, does not only offer a vast expertise in tool production but proves to be a reliable development partner for its customers. The latter often know what they want to do, but do not necessarily have the knowledge to put their ideas into practice. How many helices does the milling burr need? Double-lead version? Point shape? Coating? Ball-nose end mills? The Precxis team understands these aspects and support the customers in achieving success.

"We love to say that Precxis guides its clients on their path towards performance and success. We believe our customers from the complex management tasks, so they can focus on the essential." Based on some essential information, Precxis can manufacture customized milling burrs with batch sizes from 20 to 100,000 parts.
Precxis is a synonym for men and women with varied competences that are close to you and committed to offering valuable advice and ever more efficient and relevant service. These qualities are equally attested to Tornos and, to be more specific, the people behind the name Tornos.

Prompt top-class service

"We have known the Tornos France team for a long time now because they have supported us on for various other investments. The friendly and responsive Tornos people were always glad to help with competent advice. This has been an important aspect that encouraged us to opt for the EvoDECO 16. We are not disappointed with the machine and even less with the technicians of the Tornos France team who offer excellent support."

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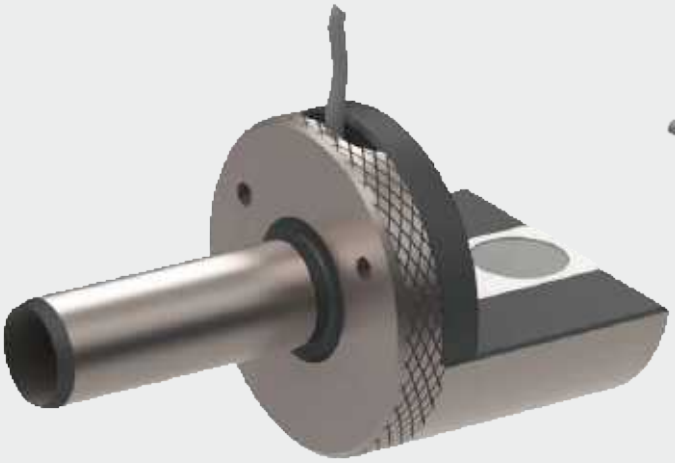

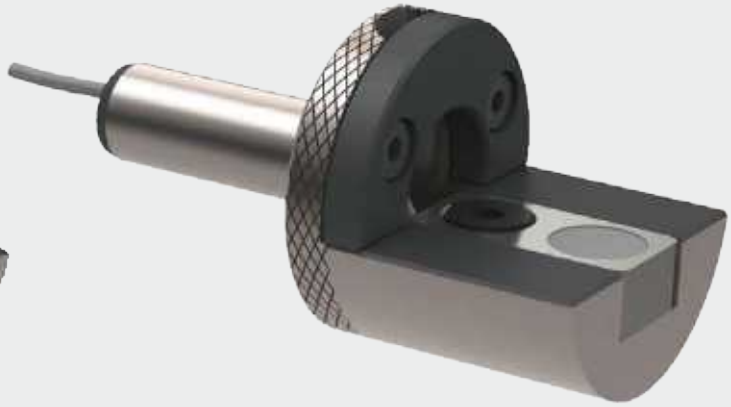

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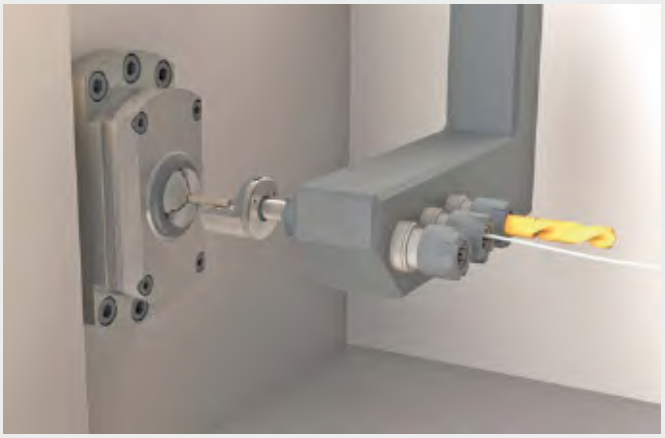

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Each apprentice, as is the case for Ismael Perez, is accompanied throughout their training by experienced professionals.

CAAJ, the ideal way

to get vocational training for jobs in high-precision manufacturing

The CAAJ (Centre d'Apprentissage de l'Arc Jurassien) was founded in 2012 to meet the high demand for training personnel in technical professions. At the beginning of the project, nine apprenticeship employers from the Swiss Jura Mountains intended to offer so-called dual training for young people from the region. The goal was to encourage learners to opt for an apprenticeship in a technical field – a field that, today, no longer or not necessarily fires enthusiasm among school leavers. In this time of industrial crisis, and considering the Covid-19 pandemic, we met Danielle Ackermann, Director of the CAAJ.

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"At the beginning, the CAAJ met a real need of industry in the Swiss Jura Mountains," CAAJ Director Danielle Ackermann explains. This woman of character brings more than 25 years of experience from being the head of her family business, and she deplores the worsening of the situation and worries about the shortage of young people in technical professions. "This year, this completely unexpected virus appeared and worsens the situation for the recruitment of apprentices as polymechanics, micromechanics, manufacturing mechanics and even as practical mechanics (with AFP graduation (AFP = Attestation Fédérale de formation Professionelle) dissipates. However, when the order books fill up again, the lack of skilled workforce once again will pose a major problem."

So, at the end of the summer holidays, Danielle Ackermann and her team will welcome no more than

9 new apprentices. Up to now, 9 apprenticeship contracts have been signed while, in the previous year, the CAAJ was operating at full capacity with all of its 15 apprenticeships occupied. "Missing apprentices in the time of crisis will have adverse effects for the industry when the market recovers," Danielle says.

Apprenticeships – vocational training that is typical for Switzerland

Above all, the good health of the Swiss economy with a general unemployment rate of below 4%, is due to the high quality of the vocational training system oriented towards the job market and incorporated into the general education system.

At the end of their compulsory education, young Swiss people can choose between continuing their studies or the vocational training that, in most cases is provided as 'dual' training. The latter combines school and practice. The basis of this kind of vocational training is the apprenticeship passed within a company with three to four days of hands-on training per week and training courses at a vocational school. This vocational training, for which the apprentice gets paid by the employer, lasts between two and four years and is terminated with the vocational qualification certificate CFC (Certificat Fédéral de Capacité) or AFP (Attestation Fédérale de formation Professionnelle). The former apprentice can now directly enter the job market or start post-degree studies. Many of the managing directors of Swiss SMEs have taken this path.

The CAAJ thus represents an ideal vocational training center and provides a kind of 'conditioning' of the apprentice who is supervised at the CAAJ throughout the first part of his training. Theory and practise are combined and on-the-job-training is provided at regular intervals within the company.

"The CAAJ grants the apprentices the time required to learn and ask questions. They progress in a structure similar to that of a company and can familiarize themselves with certain processes"

Against this backdrop, she even increases her efforts to persuade even younger people, girls and boys, to take this path. "Through the collaboration with #bepog, we have established recruitment 'speed dating' events for technical professions," she enthuses. "And with these new events that we will repeat at regular intervals, we already have a certain degree of success."

Efforts to persuade the youth

The CAAJ team is making every effort. On the one hand, to convince the companies to get involved in such a partnership and, on the other hand, to convince the young people from the Swiss Jura Mountains to opt for one of the four possible training programs within the CAAJ. "We have even written an instruction manual for our speed dating events, so we make sure everyone feels at ease and is prepared to face the conversation that often is regarded as the prelude to a real job interview."
Furthermore, CAAJ invites young people to participate in regular discovery courses that enable them to discover different technical professions. For the eight years since its establishment, the CAAJ has already hosted more than 300 young people to give them a taste of their potential future vocational training.

No Open-House days in 2020

Danielle Ackermann's desire to whet the appetite is infectious. This year, however, the CAAJ will not open its doors to the public. The event that has been essential for the apprenticeship center has had to be cancelled due to the Coronavirus. "We need to constantly reinvent ourselves and offer new prospects for these technical professions that are so often overlooked by the general public. Even if the CAAJ is headquartered in Moutier, the birthplace of bar turning, we are still meet with some resistance and even with certain prejudice such as 'apprenticeships are too expensive'."

Today, however, you have to acquire a lot of knowledge and skills to be able to operate current machinery and handle the associated programming software. "At a first glance, these professions admittedly seem to be more manual, physical occupations requiring more work than simply sitting in an office, but you should not forget that they are professions that offer job vacancies and the possibility to make your career," emphasizes Danielle Ackermann.

For CAAJ's Director and for her entire training team that supervises the apprentices throughout the first two years of their apprenticeship, it's all about finding the right language. The concept is based on

the direct transfer of know-how. The young people are learning from the older ones. But that's not all. While theory and practice alternate regularly, teaching is well diversified. The apprentices have targeted courses and more specific options, be it the possibility of familiarizing themselves with lubricants or of learning more about cutting tools. The CAAJ can also count on Tornos. The company trains its apprentices at the CAAJ and provides the CAAJ with the latest generation of machine tools.

Since 2012, the CAAJ has trained more than one hundred apprentices with a success rate that comes close to perfection, as almost all learners have finished their apprenticeships successfully. "The CAAJ grants the apprentices the time required to learn and ask questions. They progress in a structure similar to that of a company and can familiarize themselves with certain processes," Danielle Ackermann adds. "So, everyone at the CAAJ clocks-in in the morning and clocks out at the end of his or her working day and does the same for the breaks in-between. The apprentices wear suitable working clothes for their particular jobs and follow the rules of the apprenticeship center. Thanks to various on-the-job-training units organized within their company, they plunge even deeper into practice and confront job reality, directly in the field."

Apprenticeship at CAAJ – stage by stage

Once having selected the CAAJ training program, the apprentice will be provided with full vocational training. Every apprentice who opts for the apprenticeship at the CAAJ will undergo three 6-month stages. This starts with mere mechanics to the work on cam-type machines and finally improvement of the knowledge on a CNC machine. At each stage, the apprentice is supervised in their efforts and gradually learn to obtain more and more autonomy. Tornos commits to equipping the CAAJ with machines – from the oldest to the most advanced ones. So, the apprentices spend the first two years (or 18 months) in the CAAJ

Partnership CAAJ & Tornos

youtube.com/watch?v=tPPuvkJ77og&feature=youtu.be

workshops to gain basic mechanical knowledge. Afterwards, they continue and finish their apprenticeship in a partner company like Tornos. Even if Danielle Ackermann is sounding the alarms to raise the awareness on behalf of the companies, she also banks on the development of the CAAJ and has a vision of what this apprenticeship center might look like in the long run. "We plan to move to new premises in 2022 to offer an even more favourable environment for apprentices. While today, the training area is divided, all apprentices will work in the same workshop in future. Our plans to invest in machinery and devices in the next 3 years are equally important.

Convinced of the idea of "together, we are stronger", Danielle Ackermann expands her contacts and favours the collaboration with other apprenticeship centers as well as with the CEFF and Filière. "The CAAJ undertakes practical vocational training whereas the CEFF provides theoretical training," she continues. In the long run, the outlines of vocational training might be re-defined and the range of the courses offered might further broaden. "To date, this has been a rather closed world by definition," Danielle summarizes. "But when it's about vocational training, we have to be open-minded. And we will advance best through collaboration with others."

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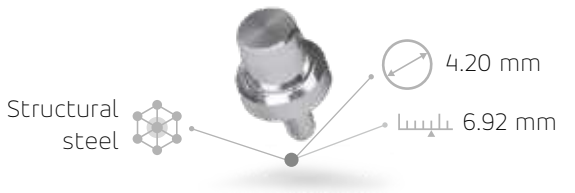
The basic MultiSwiss programs within TB-DECO have been created in a way to be able to always work safely and achieve any workpiece dimensions. In most cases, this is sufficient since the average cycle times are about 8 seconds and the feeding or discharge position does not affect the total machining time. In particular cases, however, we have the possibility of optimizing the workpiece discharge and feeding positions to boost productivity.

By default, every MultiSwiss can produce up to 15 workpieces per minute. With the optimization mentioned above, you can achieve a throughput of 20 workpieces per minute or even 40 workpieces in double cycles. This makes the MultiSwiss very competitive for very simple parts that are currently machined on cam-controlled multispindle lathes or on an array of entry-level Swiss-type lathes.

Mr Martoccia, MultiSwiss machines already boast high productivity levels. Is it possible to get more from them?

We are already achieving high production rates, but in certain cases, we can increase them significantly. By optimizing machine operation depending on the workpiece to be produced, we can improve the productivity and tap into the full potential from the machine. To achieve this goal, we must study the workpiece drawing and the machining strategy. In this way, we proceed step by step. First, we use the standard model to optimize the paths and, if necessary, we then use a workpiece-specific model for the next step. The results are conclusive: the output of more compact workpieces, optimized paths, discharge delay monitoring, and this goes without saying, mechanical bar feeding.



Automotive

And does this work with all workpieces? Or are there any constraints?

The simpler the workpiece, the more the potential is increased. This means that we have different strategies to optimize cycle times. They range from a simple program change (discharge position or certain synchronization functions) to mechanical modifications of specific bar feeding or workpiece discharge elements.

However, we can go even further with the possibility of machining 2 or even 3 workpieces per cycle with one sole bar feed or several parts feeding processes.

Another important aspect to be taken into account is the number of parts to be produced. It does not make much sense to invest several hours for production savings amounting to 5% for a workpiece with a batch change after just one week. By contrast, as the case may be, the gain may reach 30% over several months of production.

The essential parameters for this analysis are the batch size and the fact whether the lead times of the workpiece are to be found in the feeding stage and/or at the main and back-machining positions.

And is there anything the customers can do themselves?

Up to a certain level, yes. For instance, simply modifying the program values or replacing a bar feeding macro with direct programming. It goes without saying that you need good programming skills and has to be careful about what you are doing during machine set-up. The Tornos technicians will be pleased to assist you in implementing this optimization.

Why is this program not included in the standard configuration?

Both our machines and the basic programs must be able to safely work under all circumstances and for the maximum workpiece geometries within the rated output of our machines. This, incidentally, works very well in most cases. There are, however, particular cases, especially in high-production mode, where customized optimization enables savings of several tenths of a second. This may be negligible for standard production rates but may become a deciding factor when it comes to high-production workpieces that are turned over extended periods.

How can interested customers find out whether their workpieces are eligible for high productivity tweaks? This is quite simple: the only thing they must do is to contact their local Tornos service center. The Tornos technician will be pleased to study the workpiece at hand and analyze the potential optimization possibilities.

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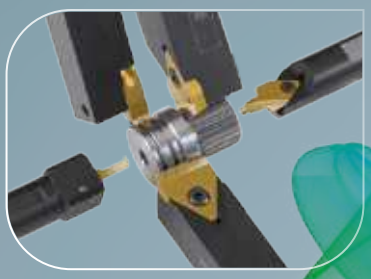

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The new Customer Center in Milan is now ready to welcome Italian customers.

The New Customer Center in Milan

is ready to welcome customers

Tornos' new Customer Center Milan will officially open its doors in October 2020. Its inauguration, originally planned for May, was postponed due to the coronavirus disease pandemic. Tornos Italy General Manager, Carlo Rolle discusses the Italian market, Tornos' contributions, and the role the modern new Customer Center Milan will play.

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What does the new Customer Center Milan have in store for its visitors?

In the new Customer Center Milan, our customers will be able to discover our range of machines in specially equipped premises. With this customer center concept, Tornos offers its customers insight into what Tornos is all about. It is a way for them to live the Tornos experience from A to Z, receiving professional advice in a specially designed environment.

This is how our new 800-square-meter showroom enables us to present our single-spindle machines, including a Swiss DT, a Swiss GT, an EvoDECO and a SwissNano 7, as well as a MultiSwiss. Our customers will be able to see the machines firsthand and in action.

The entire Tornos Italy team is looking forward to welcoming its customers to its new premises.


TORNOS

Grand Opening and BIMU in Milan

The opening ceremony of the new Customer Center Milan will take place on Tuesday, October 13th at 3 pm. After the opening speeches and official ceremony, the 150 guests will have the opportunity to tour the new Customer Center. The opening ceremony is a prelude to the 32nd BIMU exhibition that will take place from 14th to 17th October 2020 at the Fieramilano in Rho (MI). All visitors to the trade fair are also invited to visit the new Customer Center Milan. ***The entire Tornos Italy team is looking forward to seeing you at BIMU on Stand D28 in Hall 11.***

For further information, please do not hesitate to contact Tornos Italy at:

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Stand D28

Is the Italian market different from other markets?

The Italians have always been keen to stand out. The same applies to machine tools. It is all too often ignored, but at the European level, Italy is in third place, just after Germany and France. It is true that Italy has been strongly affected by the Covid-19 pandemic, but that is also why the market is much more responsive. Indeed, the recovery is already taking off more strongly in Italy, and perhaps the most surprising thing is that the automotive sector is the most responsive at the moment. We have always had around 70 percent of our orders in this sector, and despite the global slowdown, it is still in the automotive sector that our machines are most in demand.

So Tornos Italy plays an important role in this sector?

It is obvious that Tornos has a leading position in this market, which is certainly fluctuating. Our structure is ideally sized to react to fluctuations. We are extremely flexible and able to quickly react to requests. In addition, we have been able to forge important links over the years with our loyal customer base. This is why our new Customer Center Milan is a strong sign, an important sign, for our long-standing and more recent customers, who realize that Tornos is committed to the long term, to sustainability, by offering them new perspectives.

Precisely what are the prospects for Tornos in Italy?

We will continue our long-standing collaborations in the automotive sector, while at the same time exploiting new territories. We have good customers in the Medical & Dental sector, particularly in the field of implants, and we are constantly exploring new markets and taking up new challenges. Anyone who comes to Tornos will find us to be a reliable partner, capable of meeting their requirements and doing everything necessary to satisfy them. Although our structure is small, we are perfectly capable of taking on major challenges. The new Customer Center Milan is a strong sign for the Italian market, which will always experience Tornos as a partner capable of meeting its needs.

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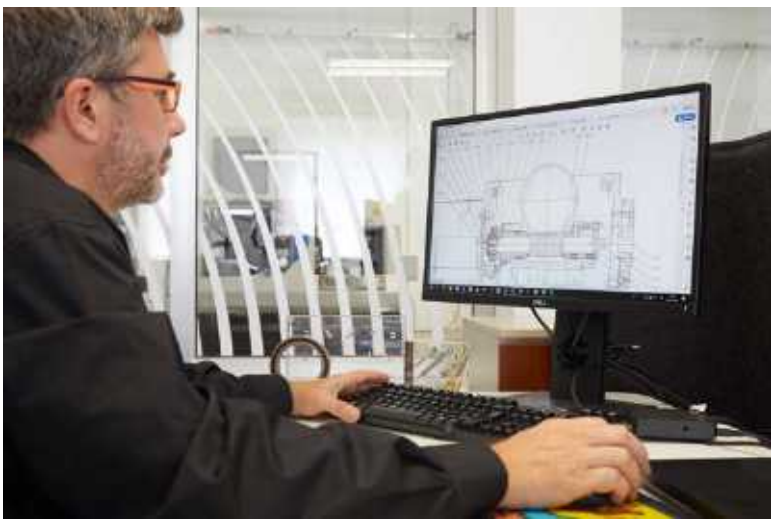

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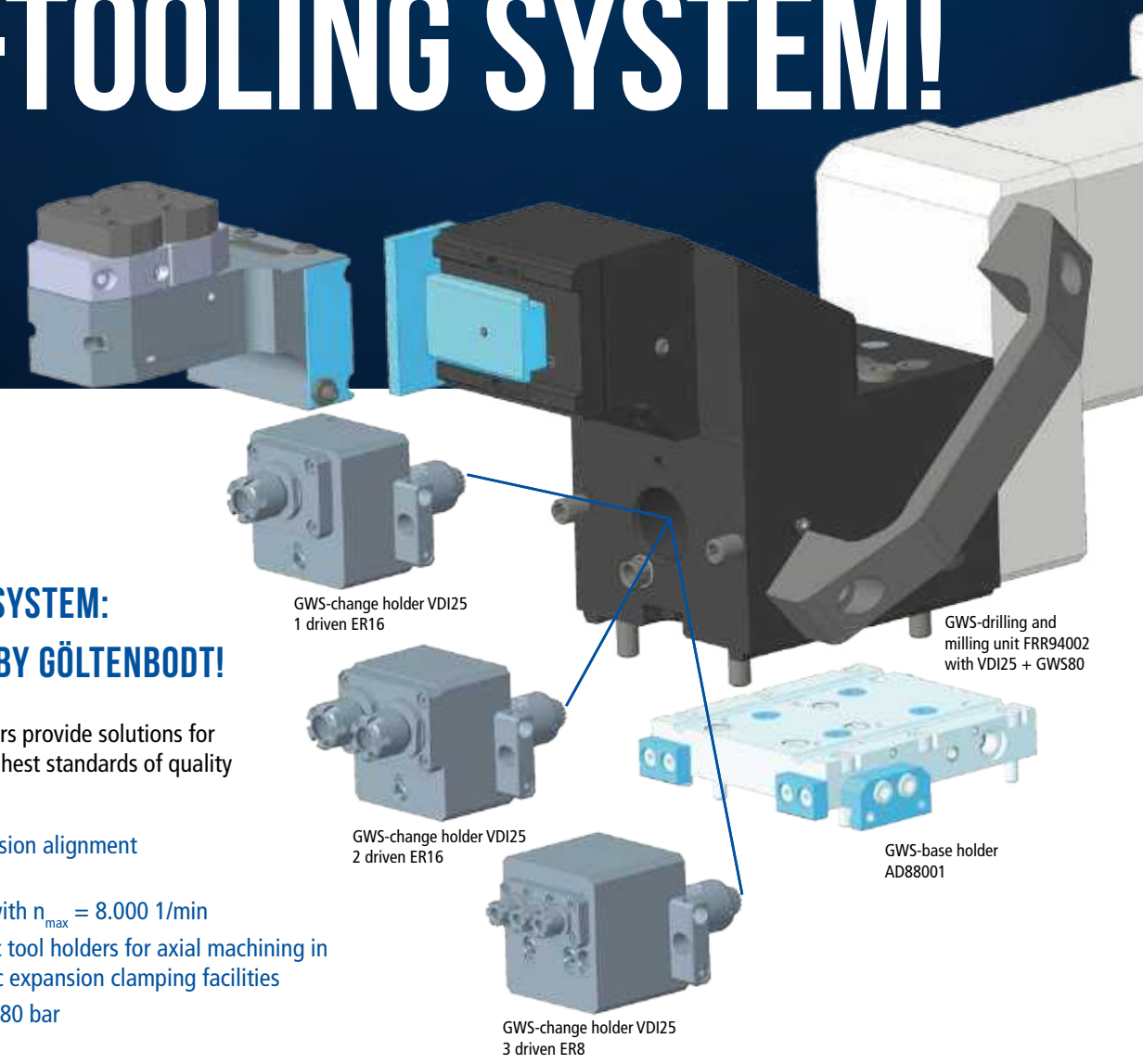

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