

# decomagazine

77 03/16 ENGLISH



**On the way**  
to Industry 4.0  
with TISIS



**One-hundredth**  
SwissNano sold in  
Switzerland



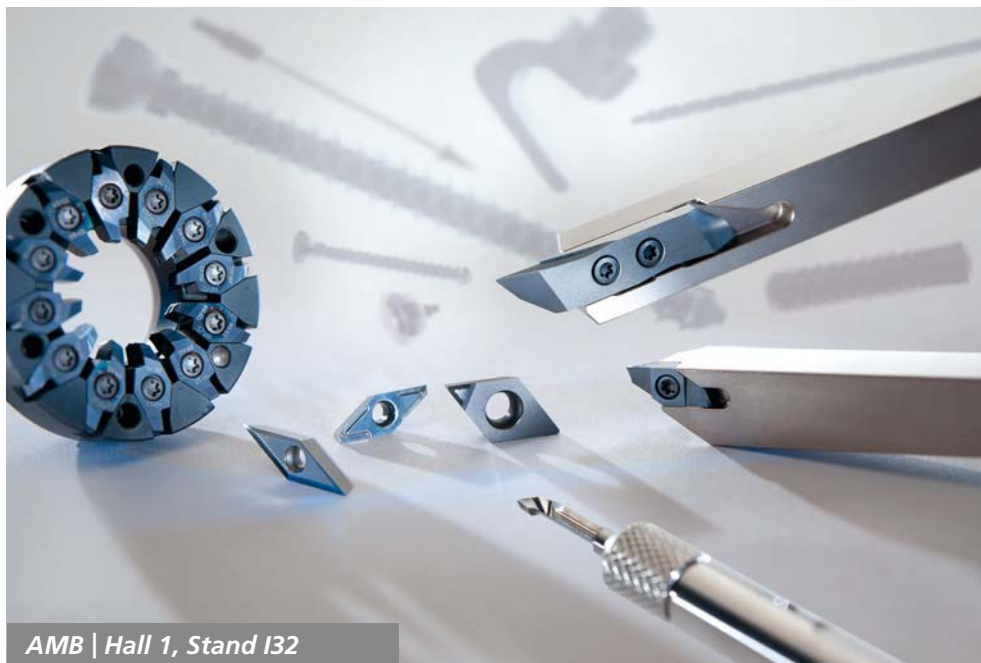
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specialist relies on  
Tornos production  
machines



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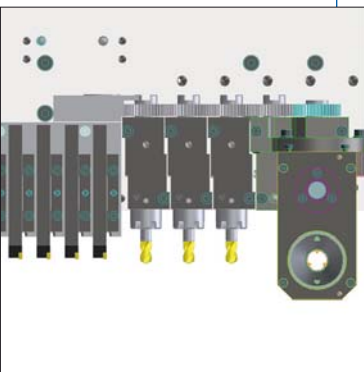
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The Swiss DT 26 –  
One of the most flexible  
machines available

23



Microdeco – Over 50 years  
of success with Tornos

33



Supreme Screw Products –  
Exceeding expectations  
every time

45



Tornos is now  
expanding its machine  
overhaul program

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TORNOS SA  
Rue Industrielle 111  
CH-2740 Moutier  
www.tornos.com  
Phone +41 (0)32 494 44 44  
Fax +41 (0)32 494 49 07

Editing Manager:  
Brice Renggli  
renggli.b@tornos.com

Publishing advisor:  
Pierre-Yves Kohler

Graphic & Desktop Publishing:  
Claude Mayerat  
CH-2830 Courrendlin  
Phone +41 (0)79 689 28 45

Printer: AVD GOLDACH AG  
CH-9403 Goldach  
Phone +41 (0)71 844 94 44

Contact:  
plumez.j@tornos.com  
www.decomag.ch

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**NEW**

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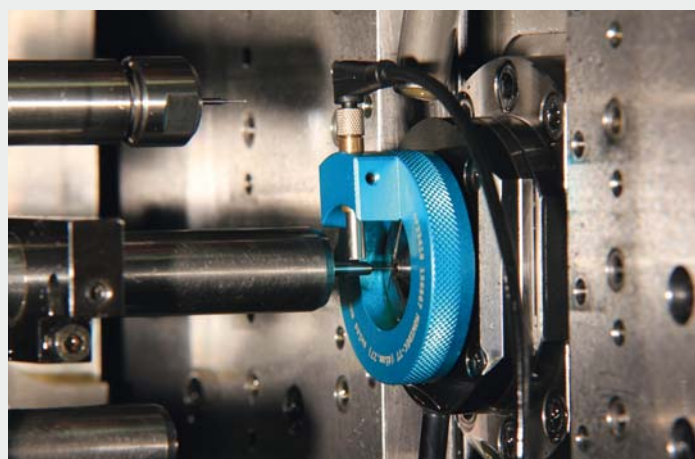
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# TORNOS

## VISIBLE EVIDENCE OF A NEW TORNOS

In keeping with our promise, “We keep you turning,” Tornos is tirelessly building a more productive and profitable future for our customers around the world. Sound like a bold claim? It is, and we assert it with confidence.

In many respects, you could say that today’s Tornos is a new Tornos. The evidence is visible in the perfect workpieces our solutions enable. It’s visible in the profitability and efficiency our customers experience on a daily basis.

We see our new logo and machine signage as a new outfit tailor-made to convey our role as a truly global, agile and innovative partner to you. We display them with pride and as evidence that you have chosen us as your trusted partner for turning solutions.

Our corporate design, to which our logo and machine signage make important contributions, is evidence of our core values—agility, open-mindedness, daring, reliability, and sharing. Our visual identity advances our vision of being a truly globally acting, innovative machine tool company, continuously helping you increase your competitiveness by offering superior manufacturing solutions and services worldwide. At the same time, our visual identity serves to remind us every day that we work for you, our customers. Our flexibility and agility are essential levers for your success.

Your first chance to further experience evidence of our commitment to you, from our new logo and machine signage to an impressive selection of solutions, is AMB 2016. That’s where you’ll meet our new MultiSwiss 6x32—the big sister of our already-popular MultiSwiss 6x16—and you’ll get to know our new Swiss GT 32, our latest-generation solution for easily manufacturing even the market’s most



complex parts. And you’ll experience our compact, flexible SwissNano, which has established itself as a go-to solution due to its unique kinematics enabling turning, drilling, cutting, deburring, roughing and finishing. You’ll see how our TISIS and TISIS Cam are your portal to the world of Industry 4.0, and you’ll get a feel for Tornos Service which backs every one of our solutions, throughout the full machine life cycle.

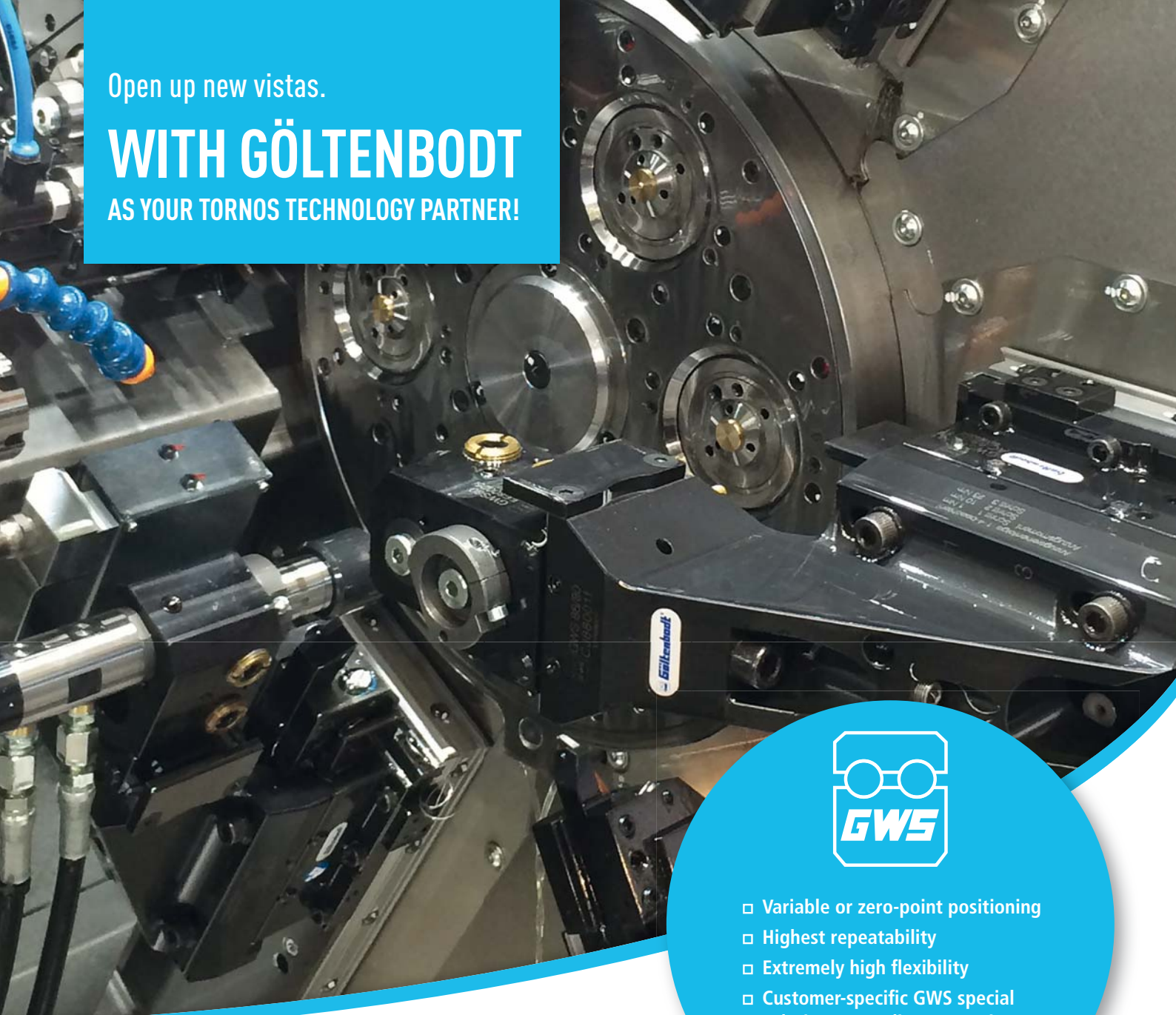
As we continue to innovate on your behalf, we invite you to experience even more evidence of our commitment to you. We look forward to welcoming you at AMB (hall 3, booth C14) September 13-17 in Stuttgart, Germany; IMTS (booth S-8275) September 12-17 in Chicago, US; and other important industry events in the coming months.

*Michael Hauser*  
CEO

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## MULTISWISS – NOW AVAILABLE IN LARGER SIZES



Tornos is delighted to now present a new XL-size machine base for its multispindle lathes that will be offered in two variants, the MultiSwiss 8x26 and MultiSwiss 6x32.



Tornos has now extended its MultiSwiss portfolio of solutions with the arrival of new machines for processing workpieces with diameters from 4 to 32 mm. The two new variants have been designed with the philosophy and technology that made the MultiSwiss 6x14 and MultiSwiss 6x16 machines such a success. The new MultiSwiss 8x26 and 6x32 models are equipped with sliding headstock spindles including Z-axis, barrel indexing with a torque motor and a container that comprises all peripheral units required for machine operation.

The floor space requirements have been optimised. Just like the smaller models, these new machines mark a sharp break from conventional multispindle machines and further bridge the gap between multi-spindle and single-spindle lathes. The technology in these machines enables them to almost reach the cycle times of cam-driven multispindle lathes.

### VARIANT NO. 1

#### **MultiSwiss 8x26 – Eight spindles with more possibilities**

With its eight spindles and eight slides for front machining, where each slide can hold up to three tools, the MultiSwiss 8x26 will bring the MultiSwiss range to a new performance level in terms of complexity and productivity. Thanks to its highly dynamic eight synchronous-drive spindles and ultra-fast barrel indexing, the MultiSwiss 8x26 can produce elaborate workpieces with extraordinary productivity.

Its 11 kW high-power spindle drives boast a high torque of 16.1 Nm. All spindles, including the counter-spindle, have their own C-axis. In being able to reach 8,000 rpm in just tenths of a second, the spindles make a major contribution to machine performance. The maximum standard workpiece length is 65 mm. Optionally, the machine can be equipped



## The present

with Y-axes that will further increase the potential of the machine. It is available in 3 configurations. Firstly, a "simple" set-up without Y-axis, the "intermediate" with 3 Y-axes or the "full" system with 6 Y-axes for the most complex parts.

### VARIANT NO. 2

#### **MultiSwiss 6x32 – 32 mm, 19.5 Nm.**

##### **All you need for large diameters**

The MultiSwiss 6x32 that will be making its debut at this year's AMB in Stuttgart, Germany (hall 3, booth C14), has the same base as the MultiSwiss 8x26 machine. It is equipped with 6 independent spindles with hydrostatic bearings and can machine bars up to a maximum diameter of 32 mm. To achieve excellent machining conditions with such diameters, the 11 kW motor has been designed with a higher torque of 19.5Nm. The maximum spindle speed is 6,000rpm and workpieces with a maximum length of 75 mm can be machined. This machine can be equipped with three Y-axes.

Let's now look at some basic items 'ALL' MultiSwiss machines have in common

#### ASSET NO. 1

##### **Ergonomics**

The machining area has great accessibility, a unique asset of the machine range. The operator can 'enter the machine' as the ergonomic design allows operators to change tool holders without leaning forward to reach into the machine. The working area is the largest in the machine class. This outstanding accessibility implies important economic benefits when changing over jobs. Even if the machine is fully equipped with complex tool holders, its design allows better chip removal compared to conventional multispindle lathes.

#### ASSET NO. 2

##### **Hydrostatic technology for outstanding parts**

All MultiSwiss machines are equipped with independent sliding headstock spindles with hydrostatic bearings. The Z-axis especially allows the machining of workpiece lengths that are difficult to achieve with conventional multispindle lathes. At each machining position, the operator can precisely adjust the speed and the machining conditions. Each spindle has its own C-axis. The hydrostatic bearings provide better shock absorption, which

enhances the obtainable surface finish while extending the tool life. This technology has already demonstrated its effectiveness on the MultiSwiss 6x14 and MultiSwiss 6x16 machines. It protects the tool and even enhances machine efficiency.

#### ASSET NO. 3

##### **Torque motor for barrel indexing**

Productivity is more essential than ever before with every single tenth of a second having importance. The torque motor allows indexing times of 0.4sec. and perfectly complements the optimum performance characteristics. This technology was introduced with MultiSwiss 6x14 and the MultiSwiss 6x16. It replaces the Hirth serration that had been used for the majority of the customary multispindle lathes and boasts the same features whilst running with absolutely silence.

#### ASSET NO. 4

##### **Comprehensive back machining capabilities**

The counter-spindle is installed in two axes and ensures completely independent operation. Up to five tool positions are available for complex machining tasks. On two of the five positions available, driven tools can be mounted. Thanks to the extremely dynamic synchronous-drive counter-spindle, acceleration and deceleration times can be kept as low as possible. The unique kinematic design with the arrangement of the tools for back machining in close proximity to the machining spindle reduces tool travel and slashes machining times.

#### ASSET NO. 5

##### **Versatile tooling system**

The versatile tooling system with preset quick-change tool holders provide optimum utilisation of the astute kinematic configuration of these machines. The machine can be equipped with up to three tools at each position. At the same time, a strong emphasis has been placed on flexibility. These systems will save minutes during frequent tool changes and set-ups.

#### ASSET NO. 6

##### **"Plug and run" system for driven tools**

Each of the driven tools that were introduced with MultiSwiss 6x14 and 6x16 have their own motor. This means belt drives and other gear units are no longer needed. The direct drive system is rigid,



precise and simple. Simple means you only have to install the tool unit on the machine and connect it to one of the sockets provided in the machining area. This ensures that tool holders are recognised by the machine and are ready for use.

#### ASSET NO. 7

##### **An all-in-one concept**

Full integration of all required peripherals has been perfectly designed. All peripherals are arranged at the rear side of the machine in the very same 'container'. As standard equipment, the MultiSwiss includes bar feeder, chip and oil management. This is complimented by a dual filtration system with a paper-type filter (filter mesh 50µ) that is complemented by an ultra-fine filter (5µ). Options such as oil mist extractor, chip conveyor, fire-extinguishing system and high-pressure pump are available to harmonise perfectly with the machine. The fact that this perfect integration was conceived from the very beginning means the MultiSwiss requires less floor space and will quickly find its way into every workshop.

#### ASSET NO. 8

##### **Precision and thermal control**

The precision of a machine is closely linked to its thermal behavior. Temperature management on the machine is completely effected by the cutting oil that is controlled by a plate heat exchanger. The machine core is kept at a constant temperature, even if the machine is stopped during production. For even better efficiency, the control system can be preset to reduce the normal warm-up time of the machine.

Apart from the conventional integrated chiller system, the MultiSwiss has a plate heat exchanger that can be connected to the plant's central cooling system. With this type of system, it is not necessary to install a distinct cooling unit on every machine and this concept perfectly fits the energy-saving policy of many companies. The MultiSwiss is intended to be directly connected to the central cooling circuit. Precision will be ensured by the extremely precise control through the heat exchanger of MultiSwiss. However, as many companies do not have the required equipment yet, it is also possible to install a cooling unit on the machine. Companies interested in doing so, can install an external cooling unit with reduced constraints.

#### ASSET NO. 9

##### **Integrated PC**

Like other NC multispindle lathes made by Tornos, the MultiSwiss has an integrated PC. This system ensures ease of operation through a large color touch-screen. Programming is done using the TB-Deco software. The integrated PC offers high flexibility. If any program changes are required, they can be carried out directly on the machine. The PC offers further service functions such as full machine documentation that can be accessed immediately. Service, operating and maintenance instructions are also saved on the PC. In the case of an alarm, the operator can display the file and read all comments regarding the respective trouble. The operator has all information at hand and benefits from easy-to-use navigation.

If a problem arises, the remote maintenance functions enable a service specialist to remotely take charge of the machine. This means that under certain circumstances, it is not necessary to send a service technician. In any case, the diagnostics are more precise and optimise intervention.



13-17.09.2016

The MultiSwiss 6x32 can be seen at the AMB in Stuttgart (Germany) at booth C14 in hall 3.

## TORNOS

Tornos SA  
Industrielle 111  
2740 Moutier  
Tel. +41 32 494 44 44  
Fax +41 32 494 49 07  
[www.tornos.com](http://www.tornos.com)



## MULTISWISS 6x14 PUT TO THE TEST

The German trade magazine Fertigung has assessed the MultiSwiss 6x14 machine based on approximately 30 criteria. With 454.6 out of 500 points, the Tornos machine scored extremely well. Now, let's look at the results in detail.

	Max. score	Score achieved
Commissioning of the machine	25.00	19.50
Time required until job 1	12.50	10.00
Proof of machining quality	2.50	2.00
Axis measurement	2.50	1.50
User training	7.50	6.00
<b>Ease of maintenance</b>	<b>100.00</b>	<b>89.00</b>
Accessibility for maintenance	25.00	20.00
Accessibility in case of troubles	35.00	35.00
Time required to replace the main spindle	15.00	12.00
Time required to replace feed components	15.00	12.00
Automatic monitoring functions	10.00	10.00
<b>Automation</b>	<b>100.00</b>	<b>96.00</b>
Machine start/referencing	40.00	36.00
Operation/feeding	30.00	30.00
Time and effort for workpiece clamping/part transport	30.00	30.00
<b>Control</b>	<b>50.00</b>	<b>46.00</b>
Control/convenience functions	30.00	30.00
Interference checks	20.00	16.00
<b>Ease of set-up</b>	<b>50.00</b>	<b>47.00</b>
Workpiece clamping/tool clamping	25.00	25.00
Set-up work	15.00	12.00
Part feeding/removal	10.00	10.00
<b>Service</b>	<b>75.00</b>	<b>64.50</b>
Availability of service personnel	30.00	21.00
Spare parts store/manufacturing of spare parts	22.50	22.50
Part drawing archive; internet availability	15.00	15.00
Maintenance contracts	7.50	6.00
<b>TCO</b>	<b>85.00</b>	<b>81.60</b>
Existing analysis of cost drivers	34.00	34.00
Assessment and scores: downtimes/repair times	34.00	34.00
CIP at machine supplier in case of failure notification	17.00	13.60
<b>Drafting of contracts</b>	<b>15.00</b>	<b>11.00</b>
Warranty period	5.00	4.00
Payment terms	5.00	4.00
TCO process fixed	5.00	3.00
<b>Total</b>	<b>500.00</b>	<b>454.60</b>

MultiSwiss		6x14	6x16	8x26	6x32
Bar passage	mm	4-14	4-16	8-26	8-32
Max. part length	mm	40	40	65	65
Max. remnant length	mm	70	70	118	120
Max. main spindle speed	rpm	8000	8000	8000	6000
Main spindle power	kW	5.60	5.60	11.00	11.00
Main spindle torque	Nm	8	8	16.10	19.50
Max. pickoff spindle speed	rpm	8000	8000	8000	8000
Pickoff spindle motor power	kW	5.00	5.00	11.00	11.00
Pickoff spindle motor torque	Nm	8.00	8.00	12.00	12.00
Main spindle Z stroke	mm	50	50	75	75
Pickoff spindle Z stroke	mm	150	150	150	150
Number of linear axes		14	14	18	14
Number of Y axis		1 (option)	1 (option)	3 / 6 (option)	3 (option)
Number of rotating axes (C Axis)		6+1 (option)	6+1 (option)	8+1	8+1
Number of cross slides in main operation		5+1 (cutting)	5+1 (cutting)	7+1 (cutting)	5+1 (cutting)
X stroke of cross slides in main operation	mm	40	40	80	80
X stroke of cross slides in main operation with Y axis				55	55
Y stroke of the transverse slide in main operation	mm	30	30	33	33
X stroke of cross slides for back operation	mm	75	75	170	170
Z stroke of cross slides for back operation	mm	150	150	150	150
Max. number of tools		18	18	26	20
Max. number of tools for back operation		2	2	4	4
Max. number of rotating tools for back operation		1	1	2	2
Spindle cooling		With oil	With oil	With oil	With oil
Cutting oil filtration	µm	50	50	50	50
Oil tank capacity	l	900	900	2000	2000
Standard cutting oil pump: outlet pressure	bars	4.30	4.30	4.50	4.50
flow rate	l/min	100	100	140	140
High-pressure pump (options): a) outlet pressure	bars	35	35	40	40
flow rate	l/min	40	40	35	35
b) outlet pressure	bars	80	80	80	80
flow rate	l/min	26	26	37	37
Weight	kg	7000	7000	15000	14800
Installed power	kW	59	59	140	140
Numerical control		Fanuc	Fanuc	Fanuc	Fanuc
Programming system		TB-DECO ADV, integrated PC	TB-DECO ADV, integrated PC	TB-DECO ADV, integrated PC	TB-DECO ADV, integrated PC



## THE SWISS GT 32 NOW OFFERS EVEN MORE CAPABILITY

With its very comprehensive GT series, Tornos provides its customers with advanced machining solutions at a competitive price. This series is now expanding to offer even more options.



In the last Decomag edition, we presented the Swiss GT 26 and Swiss GT 26B machines that are available with or without continuously moving B-axis as well as the programming support system TISIS Cam. With the Swiss GT 13 and Swiss GT 26, customers benefit from a solution appropriate for all kinds of workpieces and diameters (up to 26 mm). To expand the machine series, Tornos set about launching an entirely new product. Now, the Swiss GT series is being rounded off with a 32 mm diameter machine. Decomag wanted to know more about the new Swiss GT 32, so we spoke with Philippe Charles, Head of the Swiss-type Product Management.

**decomagazine:** Hello, Mr. Charles, with its bar capacity of 25.4 mm, the Swiss GT 26 machine already covers a large diameter range, so why launch this new machine?

**Philippe CHARLES:** The new product responds to distinct market demands with regards to this type

of machine. The Swiss GT series is extremely interesting for all customers who are active in various market sectors. It has a 6-axis kinematic design, so it can adapt to almost all requirements. The modular set-up on the rear gang tool post enables a large variety of driven tools to be mounted. The Swiss GT is a machine with an extremely powerful and flexible kinematic system. This feature has already been acknowledged by customers who acquired a Swiss GT 26 or a Swiss GT 13. The Swiss GT 32 now offers added flexibility to our customers that want to machine larger diameters.

**dm:** What are the assets of the kinematic design of this new machine?

**PC:** The machine is based on the proven recipe that made the Swiss GT 13 and Swiss GT 26 machines a success. The 6-axis kinematic system with three axes for front machining and three axes for back machining offer almost unlimited machining

possibilities. The machine has a comprehensive range of driven tools and just like its sister models, it is equipped with three modular positions on the gang tool post that can accommodate driven tool holders. This allows the machine to accept a thread-whirling cutter, a polygon cutter, a front milling attachment and much more. The possibilities within this range are almost unlimited. On our website, you can find the product brochure that shows the possibilities offered by this tooling configuration (<http://www.tornos.com/en/content/swiss-gt>). The W&F tool holders and quick tool changing system are also available for this machine. In addition to the three modular positions on the rear gang tool post, the machine comes equipped with a unit comprising four radial drills on the front gang tool post as standard. These capabilities are complemented by eight tool positions (four of them can be driven) on the back machining block.



**dm: Both the Swiss DT and the Swiss GT series have a system that makes it extremely easy to convert them for use without guide bush. Does this configuration also apply to the Swiss GT 32?**

**PC:** Yes, just as on the Swiss GT 26 and Swiss GT 13 machines, the guide bush can be retracted in its support without having to disconnect the cables and cooling system. This feature has gained more and more importance in recent years. The first systems were quite complex and were rather tricky to retract the guide bush. By developing technology for the guide bush to be driven by a synchronous motor, this changeover is a breeze today. Depositing the guide bush takes just 15 minutes. It's very easy for the operator to register the work without guide bush in the Tornos Machine Interface (TMI) system and the spindle will then be automatically moved to the correct position.

**dm: So the Swiss GT 32 and the Swiss GT 26 machines have the same kinematic system. What are the differences between the two products?**

**PC:** Yes, exactly. The machines have a similar appearance and are based on the same kinematic system. In addition, they share the same tool

holders. As the saying goes, you should never change a winning formula and that's why we only modified the necessary components. These include the main spindle, the counter-spindle and the motorised guide bush. Some components such as the ball screws and the guideways have also been adapted to better support the stress generated during machining.

**dm: In this market segment, many similar machines are offered, so why should the customer invest in a Tornos machine?**

**PC:** The Swiss GT 32 features first-class performance, at a competitive price. Furthermore, we can offer a comprehensive range of peripherals, from bar feeder to chip conveyor and oil mist extractor. All this enables us to provide our customers with a complete 'one-stop' solution. Our TISIS programming and monitoring software as well as our TMI interface in the CNC unit can significantly improve machine programming over alternate systems. We also offer a new bar feeder, the new SBF 538 bar-feed has been specifically adapted to this new product. In a second marketing stage, just as with the GT 26, we will offer the machine with an optional B-axis that will either have fixed positioning or with simultaneous 5-axis interpolation.

**dm: When will customers get the opportunity to discover this new and obviously very attractive machine?**

**PC:** The machine will be presented at the AMB in Stuttgart (Germany). I'd like to take the opportunity to invite anyone who is keen to discover this machine and experience its flexibility first-hand at booth C14 in hall 3. The delivery of the first machines will be planned for the fourth quarter of 2016. The Swiss GT 32 lathe with B-axis will be available from the second quarter of 2017.

## TORNOS

Tornos SA  
Industrielle 111  
2740 Moutier  
Tel. +41 32 494 44 44  
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## THE SWISS DT 26 – ONE OF THE MOST FLEXIBLE MACHINES AVAILABLE

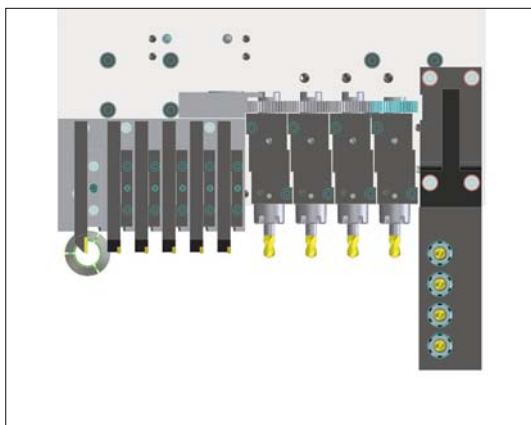
**The extremely sturdy and powerful Swiss DT 26 machine has a kinematic design that promotes chip removal. It has been perfectly designed to tackle the high stresses that are generated when machining large diameters.**



The recently launched Swiss DT 26 has already earned its first stripes. In contrast to other machines of its class, the machine has a modular machining area both for front and back machining. The Swiss DT 26 offers vast possibilities and in this article, we want to present some of the options.

### **Basic configuration**

In its basic configuration, the Swiss DT 26 machine comes equipped with six turning tools, four driven radial tools and an angle tool post that enables the installation of four tools each for front and back machining.

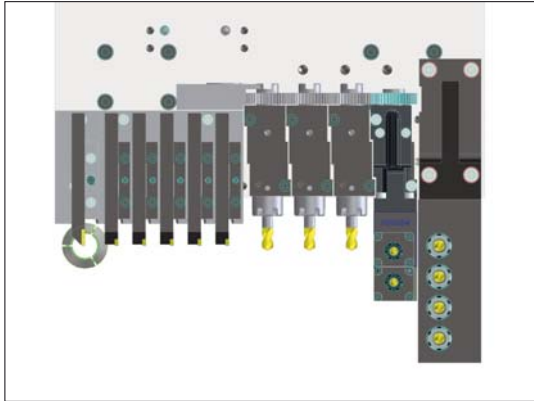


Basic configuration

## The present

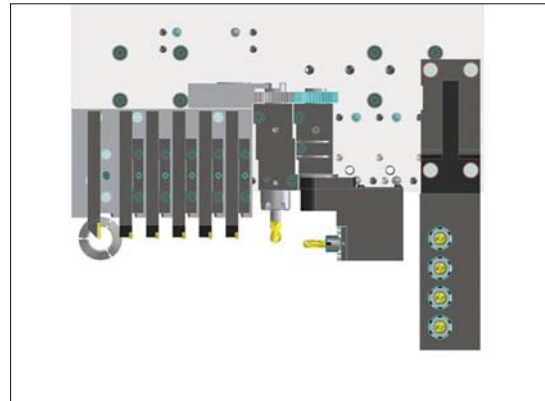
### Configuration with 2 driven tools

This machine version is also based on the basic configuration, however, a front double drilling unit is mounted instead of one of the driven radial tools.



Configuration with 2 driven tools

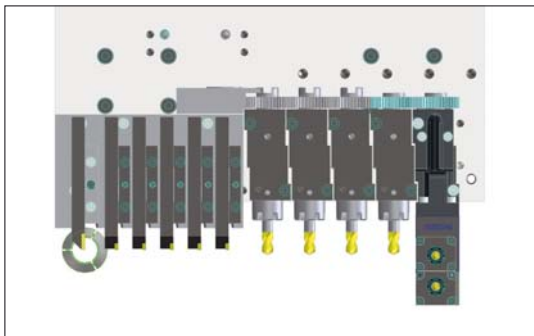
But that's not all. In fact, the Swiss DT 26 can be equipped with much more specific attachments, such as an inclined milling device that can be adjusted to an angle between 0 and 90 degrees.



Configuration with 3 driven tools (specific attachments)

### Configuration with 3 driven tools

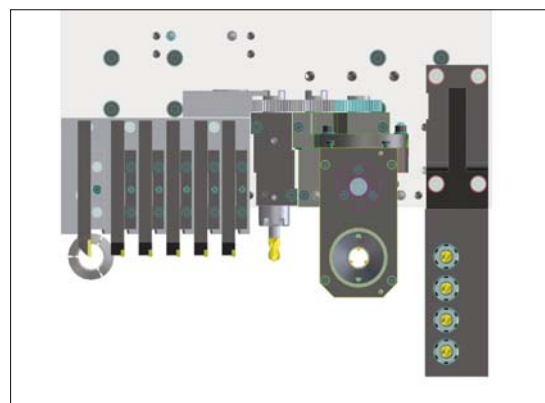
The number of driven tools on the Swiss DT 26 is variable. For instance, if customers don't need the angle tool post, it can be replaced by a driven tool unit. Thanks to the drive system, this re-tooling is rather simple and done in no time.



Configuration with 3 driven tools

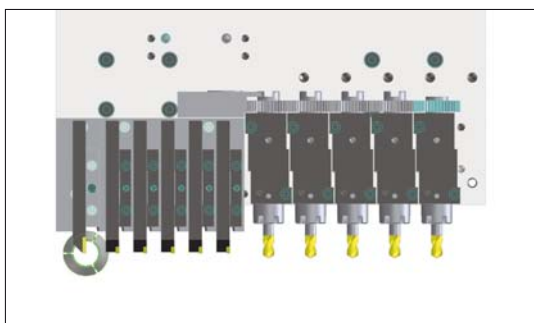
### Thread whirling with the Swiss DT 26

The Swiss DT 26 machine can also be used for the machining of medical screws. The configuration shown below is perfect proof. Customers don't even need to remove the angle tool post for this tour-de-force. It should be noted that, just as all options presented in this document, all tool holders in question can be mounted on the machine at all times. Positioning is very easy, which is mainly due to the pin system.



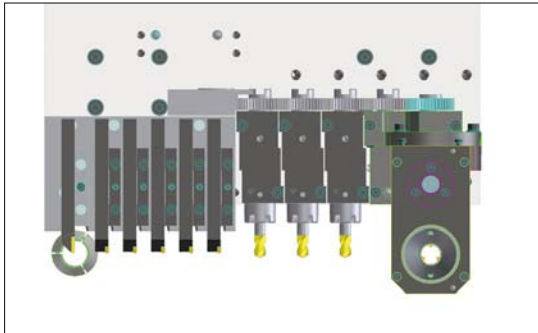
Thread whirling with the Swiss DT 26

It is also possible to mount a 5th driven radial tool on the gang tool post.



Configuration with 3 driven tools (5th driven radial tool)

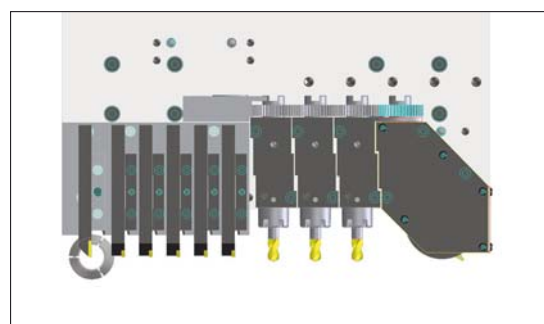
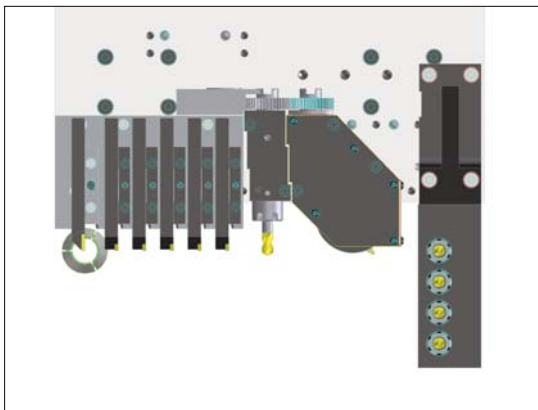
If screw machining requires more milling tasks, it is possible to remove the angle tool post and install three driven radial tools in addition to the thread-whirling cutter.



Thread whirling with the Swiss DT 26 (three driven radial tools)

### Polygon cutting with Swiss DT 26

Even polygon cutting is no foreign concept to Swiss DT 26. It is perfectly possible to mount a polygon cutter on the machine just as it is true for a thread-whirling cutter. By laying the angle tool post aside, three driven radial tools can be mounted instead of just one.



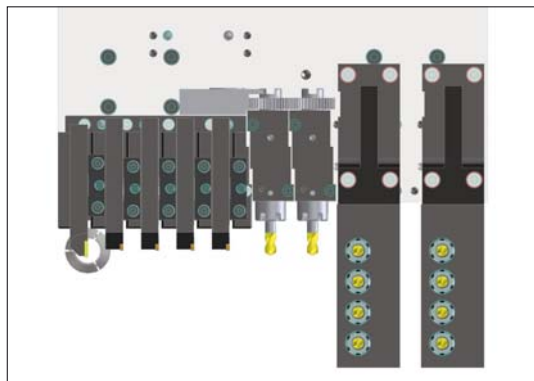
Polygon cutting with Swiss DT 26

### More front drilling

If the angle tool post is not enough, it is absolutely possible to install a second one. The options are the availability of 2x4 tools for front machining and 2x4 tools for back machining. In this configuration, the machine still has two driven radial tools.

### Free choice of turning tool holders

The turning tool holders can be adapted to meet individual requirements. Instead of 12x12mm tool sections, 16x16mm tool sections can be used. This may prove more suitable for heavy-duty machining. This machine configuration ensures the optimum utilisation of Swiss DT 26's ultra-performance spindles; the tool holder plate can be equipped with five turning tools (six in case of 12x12mm configuration).



Free choice of turning tool holders

### High flexibility also for back machining

The back machining tool block of the Swiss DT 26 can also provide a driving function that permits driven tools. Apart from front turning attachments, a slotting device can also be mounted.

### So many more possibilities with the Swiss DT 26

The machine is not restricted to the above-mentioned basic configurations. If you would like to discover the vast possibilities offered by the highly flexible kinematic design of this exciting machine, do not hesitate to contact your nearest Tornos dealer.

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2740 Moutier  
Tel. +41 32 494 44 44  
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# HAROLD HABEGGER

## Canons de guidage Führungsbüchsen Guide bushes



### Type / Typ CNC

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

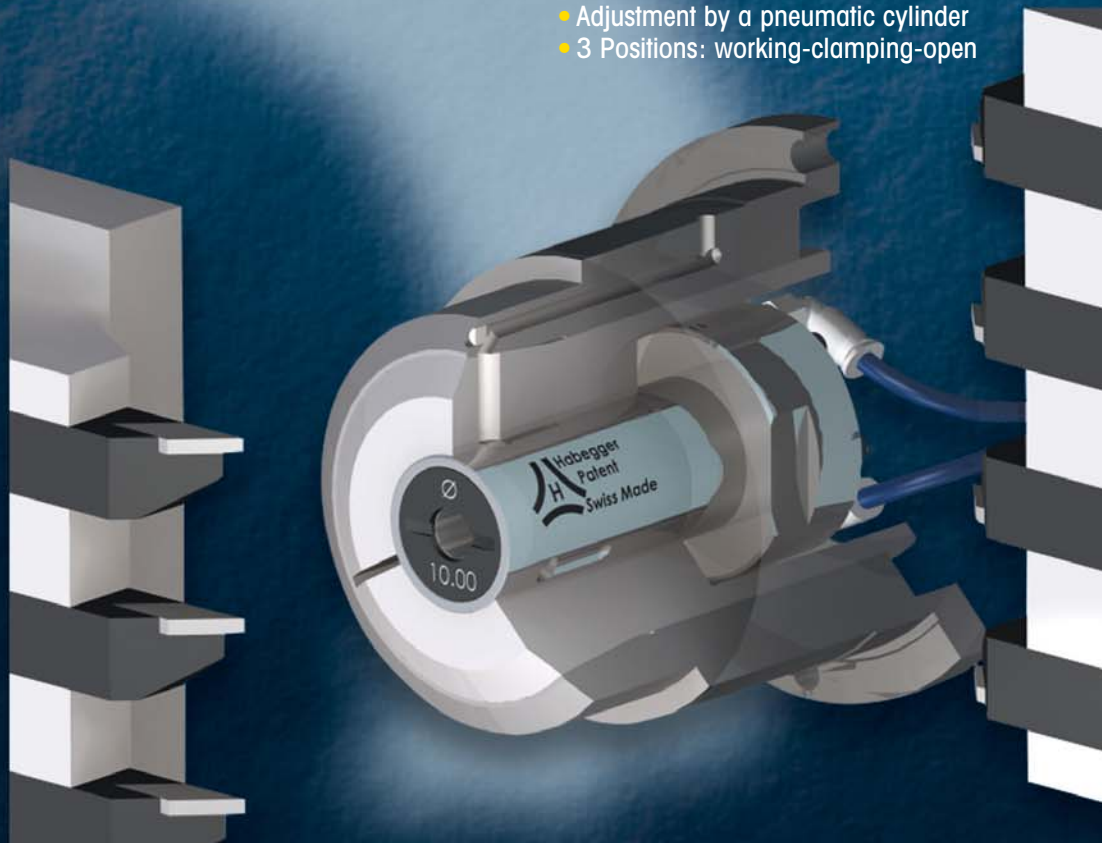


### Type / Typ C

- Réglable par l'avant, version courte
- Longueur de chute réduite
- Von vorne eingestellt, kurze Version
- Verkürzte Reststücke
- Adjusted from the front side, short version
- Reduced end piece

### Type / Typ TP

- Réglage par un vérin pneumatique
- 3 positions: travail-serrage-ouverte
- Einstellung durch einen pneumatischen Zylinder
- 3 Positionen: Arbeitsposition-Spannposition-offene Position
- Adjustment by a pneumatic cylinder
- 3 Positions: working-clamping-open



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



## ON THE WAY TO INDUSTRY 4.0 WITH TISIS

**The combination of factors such as increasing data volumes and computing power as well as connectivity and advanced human-machine interaction have all paved the way for the Industry 4.0 concept. How can TISIS and Industry 4.0 be combined?**



With TISIS' advanced ISO code editor, the user is well positioned for Industry 4.0. TISIS provides the means needed to be fast and to ensure effortless programming and real-time process monitoring. It knows the machines installed and helps the customer decide which machine to use for a specific task. At the same time, it offers the options of each machine, reduces the risk of interference and downtimes, eliminates potential errors and enhances productivity, efficiency and quality.

Let's now look at some facets of Industry 4.0 with TISIS

### **Programming – simplicity being the key concept**

TISIS' intelligent code editor simplifies programming. The ISO wizard in TISIS provides intuitive operator guidance through the ISO codes and furnishes the operator with a brief description of each ISO code

as well as options and parameters. Programming is made even easier through TISIS' integrated context-sensitive help. With the entire information for creating a new part being grouped on a single page, it is very easy to process new production processes with the new-part wizard. A summary of all the choices is displayed, so each part to be created can be checked at a glance.

With the Connectivity Pack, information on the parts machined as well as PDF files and photographs can be stored. The user can thus build up a clear-cut database that is easily accessible and allows convenient navigation.

As ISO code editor, TISIS allows color tagging for fast visual reference during data reading. By means of a convenient ISO code wizard, the correct code is always at your fingertips. Optimising part cycle times and eliminating potential errors is easy because TISIS enables prompt verification of the critical path

and permits adjustments. The Gantt chart provides a visual representation of the process that affects the workpiece cycle time. The 2D simulation function of TISIS offers even more benefits. The user can always ascertain that the tools move to the desired positions. There's no need to spend time testing the program on the machine. Just simulate and edit the tool path in real time with TISIS. At the same time, it's a breeze to save and store favorite operations in the operations library for future use for other workpieces. Thanks to the easy communication between TISIS and Tornos Machine Interface (TMI) and to syntax highlighting, comparing the files and identifying even tiny differences between the files e.g. regarding geometry or tool positioning is fast and convenient.

### **Set-up – reduction of risks being the key concept**

Tool holder management reduces the risk of interference. Optimization of the manufacturing efficiency is the central topic of Tornos' vision of Industry 4.0 and TISIS helps the customers achieve it by streamlining tool holder set-up and management. TISIS is also a virtual set-up. This means that when the tool holder library is synchronised with the machine, the appropriate tool holder will be used at the correct position. Just place the tool holders required into the respective tool posts of the virtual machine in TISIS. Any risks of interference, machine damage and downtime are reduced. Incompatibilities are efficiently identified and managed and the user is provided with a simplified overview of the tool geometry default values and of

the tools per channel. When selecting a tool holder from the TISIS library, the geometry is updated in the ISO editor and the tool holder parameters such as speed and size are immediately updated. As each tool system can be visually updated in such a simple manner, machine preparation in the workshop will be a breeze.

### **Optional: Connectivity Pack – real-time production monitoring being the key concept**

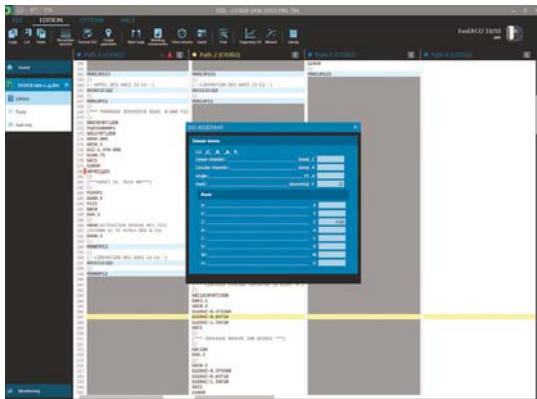
With the TISIS Connectivity Pack, all the information required, including the availability of each machine and a full overview of the workshop, is permanently available. The software allows the information to be transmitted to the machines via a simple USB flash drive or directly via the company network. For additional convenience, a program can be edited on the machine and transmitted once again to the server/computer, while maintaining full traceability. In any case, TISIS features a file comparison tool that ensures optimum ease of monitoring. Remote monitoring is close at hand as well – be it on PC, tablet computer or even smartphone. With TISIS, the user can track the production progress, supervise the workshop and quickly determine a deadline. Should a problem arise during the current production run, a message can be displayed as soon as an alarm is triggered and TISIS allows the in-depth inspection of the machine – including the temperatures of all spindles and axes – in real time.

With the TISIS Tab, the production status of each machine can be monitored e.g. by tracking the theoretical cycle time at the time of inspection and the spindle speed. The complete alarm history can be promptly retrieved to guarantee detailed production traceability. The push notification system keeps the user informed at all times.

### **Optional: Macro Camera – perfect tool set-up being the key concept**

With this camera, tool set-up is simplified significantly. It is easy to install and allows TISIS-controlled video streaming from the heart of the machining area. With its 5 MP sensor and its magnification of 400-470x, the camera is able to show every tiny detail. The built-in adjustable polarizer reduces glare and reflection on workpieces with mirror finish. The tool can be centered with high precision by simply looking at the tool position on the bar. The eight-LED lamp near the camera lens provides a perfect view of the machining area. In addition, the camera is equipped with measuring functions for even higher precision.





ISO assistant



Analyze the efficiency of your workshop.

### Optional: TISIS i4.0 software package – efficient real-time monitoring being the key concept

As for OEE (overall equipment effectiveness) platforms, a great number of solutions are offered in the market. TISIS i4.0 provides the user with an automated turnkey solution. The information is automatically entered into the system without operator intervention. The data can easily be exported into tabulated files (CSV) for all machines, for one machine only and for a defined period. At any time, the machine status can be displayed and analyzed in summarized form or in chronological order. Events can be detected easily; just place the cursor on the respective code to get the desired information. The workshop effectiveness can be quickly monitored by using pre-configured charts that are easy to exploit. Pareto charts and risk charts point out inefficient processes to enable the operator to take measures.

At the same time, it enables 3D management of complex tools. It offers direct 3D simulation of the machining process, so the complete job can be monitored even before it is started in the workshop.

A TISIS evaluation software version can be downloaded from the Tornos website under - <http://store.tornos.com/en>.

If you wish to receive further information, do not hesitate to contact Patrick Neuenschwander, Tornos' Software Manager, at [neuenschwander.p@tornos.com](mailto:neuenschwander.p@tornos.com) or please call your distributor.

### Optional: TISIS CAM – integrated CAM being the key concept

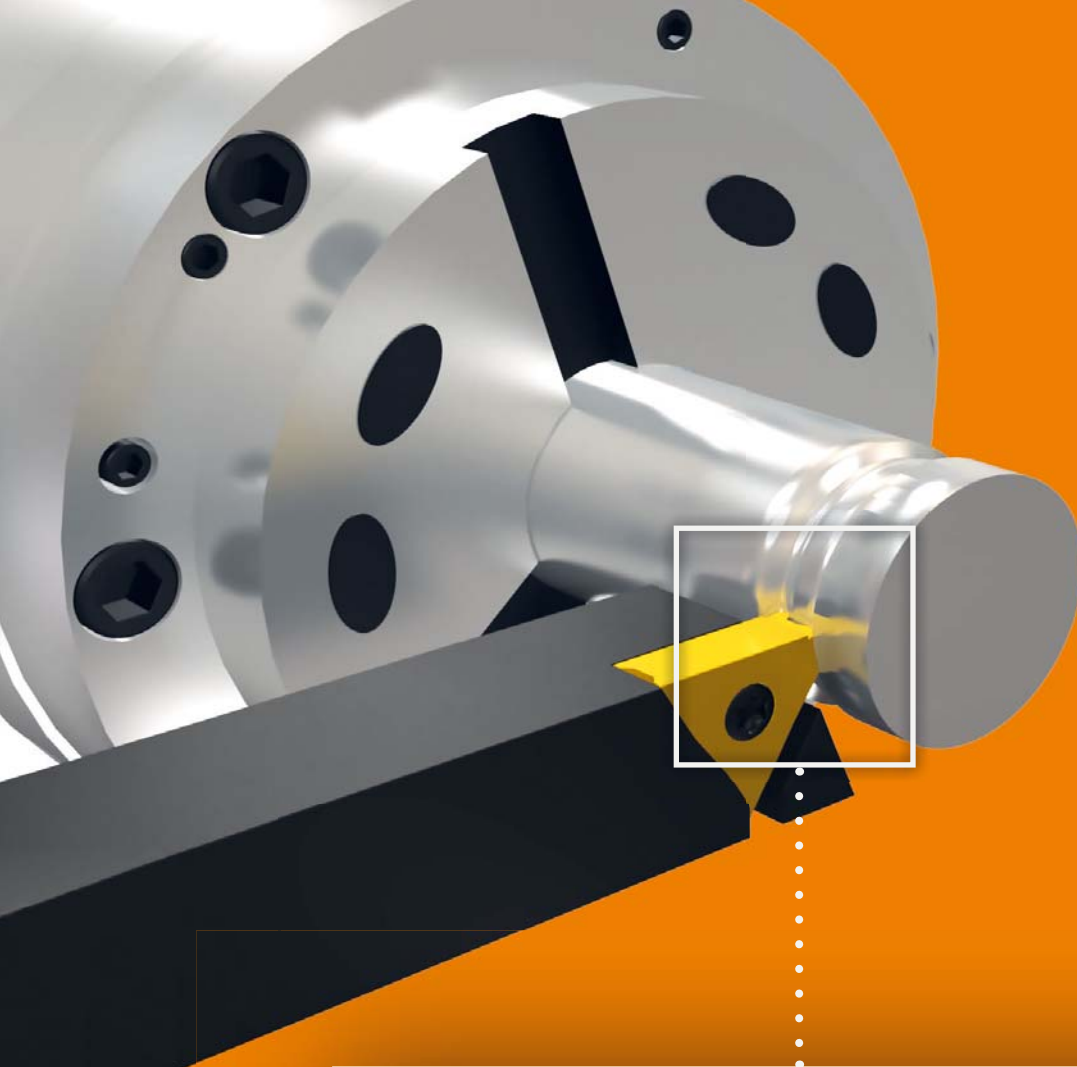
TISIS now offers the optional TISIS CAM program that has been developed in close collaboration with Mastercam to ensure optimum machine programming when highly complex parts are to be produced. TISIS CAM significantly reduces the start-up time and, in combination with TISIS, it is the perfect solution for efficient programming and workpiece optimisation. For instance, TISIS CAM is particularly useful when it comes to exploiting the full potential of a Swiss GT 26B with five-axis interpolation. TISIS CAM features a wide range of benefits for automatic and ultra-precise creation of machining programs based on the files generated by 3D CAD systems. TISIS CAM comprises tool paths specifically configured to meet the challenges of Swiss-type turning. It reads, translates, creates, edits and processes workpiece features with high precision.

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Industrielle 111  
2740 Moutier  
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WITH INSERTABLE TOOLS**



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## CUSTOM SOLUTIONS ARE SUPERIOR

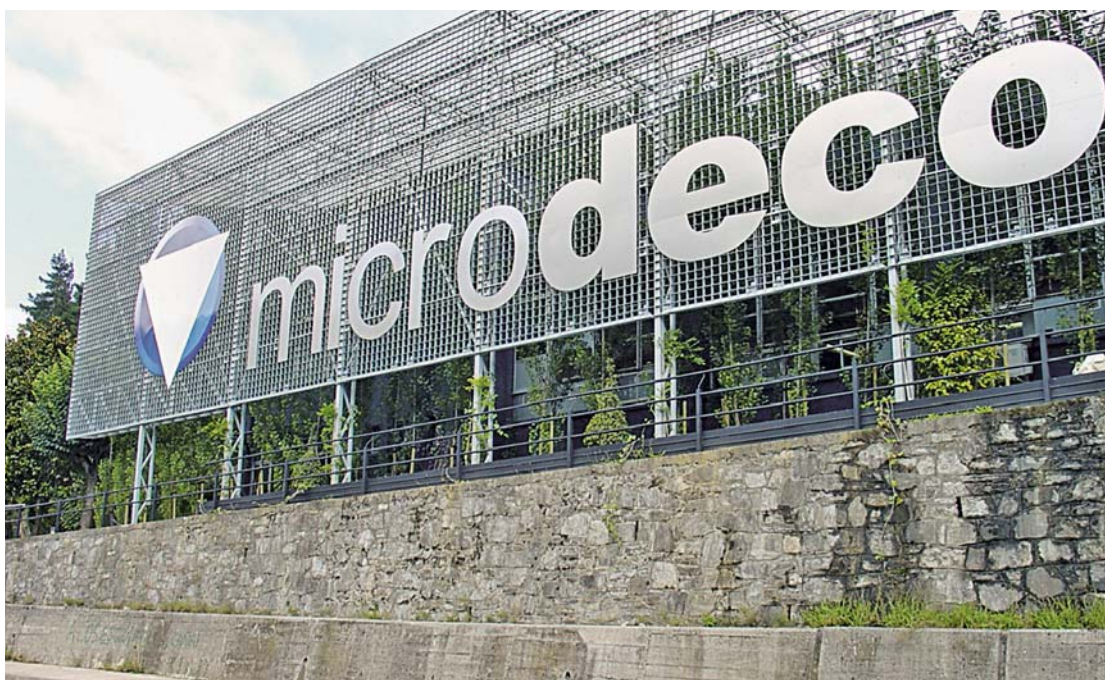
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- ❑ With five OD grooving systems we cover a cutting width range from 3.5 to 70 mm
- ❑ Mirror-like surface finishes of the tools

**80%**  
**INCREASE IN  
PRODUCTIVITY!**



# MICRODECO - OVER 50 YEARS OF SUCCESS WITH TORNOS

**Microdeco is the story of a company founded in 1963 by three associates in Ermua, a town located just a few kilometers from Bilbao in the Spanish Basque Country. Its also the story of an extraordinary indomitable will and entrepreneurial spirit that transformed the company to a blue-chip multi-national corporation working with leading-edge technology – consisting of Tornos machines only!**



Since 2005, Microdeco has been managed by José Iraolagoitia, the son of Manuel Iraolagoitia (one of the three company founders), and the company has more than 200 employees working at 5 production sites (3 in Spain, 1 in Romania and 1 in Mexico). It sells its products mainly in Europe and exports to the USA, Canada, Mexico (NAFTA), China and India. Microdeco is active in four core markets, the automotive industry being the most prominent (90%) while the medical sector represents almost the remaining 10% of the company's turnover. Microdeco also operates its own R&D unit where the company invests 3.3% of its turnover to develop new products and enhance its management system. Decomag met the General Manager to learn more about the success behind Microdeco.

## **A long-standing partnership**

The partnership between Tornos and Microdeco goes back to 1958 (before Microdeco was founded) and since then the company has always been relying on Tornos machines. The first machines had been cam-type machines, prior to the arrival of CNC multi-spindle technology especially with regard to the requirements of customers in the automotive industry. In order to come up to the requirements of the automotive sector, the company established production sites in Romania and Mexico. Its means production match the company's ambitions; Microdeco possesses the most productive and precise machines on the market. Its machine inventory comprises Deco, MultiDeco, MultiSigma, MultiAlpha and MultiSwiss machines.



View of part of the production equipment at Microdeco, Deco machines can be seen at the rear on the left. In the foreground, the numerical multispindle workshop, Mr. José Iraolagoitia, managing director at Microdeco (left) and Mr. Isaac Acrich, director of Tornos Ibérica.

### Machines adapted to the specific needs

Most recently Microdeco purchased two MultiSwiss machines and two other machines that were rather uncommon considering the workpieces usually produced by the company... the machines in question are 2 SwissNano machines! *"One of the workpieces we have to produce is very particular. It requires an exceptional surface finish. To be honest, when Tornos proposed the SwissNano machine, we first were a bit reluctant to install this small machine in our workshop – and so was our customer! We went to Moutier to watch how this part could be produced on a SwissNano machine and we were really surprised! We purchased the machine immediately. The machine really proves to be ideal for the machining of small high-precision parts; it has an outstanding stability and is still able to meet tight tolerances. And what's more, tool wear is very low,"* José Iraolagoitia emphasizes.

### MultiSwiss – reliable and efficient partners

But let's get back to the two MultiSwiss machines purchased by Microdeco: *"These two machines are working wonders,"* José Iraolagoitia stresses. *"They boast high efficiency and are perfect for us. They are easy to set up, fast and highly productive. Furthermore, they can produce parts of the highest precision (even better than MultiDeco). Today, machines not only have to produce 24 hours a day and 6 days the week, but they also have to manufacture more and more complex parts made of tough materials. The machines have allowed us to speed up our production and we can now produce parts that are demanding both in terms of material and tolerances. The hydrostatic technology is a clear advantage when it comes to machining exotic materials. The access to the machining area is excellent and set-up of MultiSwiss is as easy as on a*

*single-spindle lathe, the only difference is changing 7 collets instead of 2. These machines allow quick response, a great asset these days."*

### A turnkey solution

The concept of arranging all peripherals in a container on the rear side of the machine is not only advantageous to the footprint, but it's a turnkey solution appreciated by the user. The machine

### MULTISWISS XL

Microdeco was given the opportunity to discover the two machine variants MultiSwiss 8x28 and MultiSwiss 6x32 (see the article on page 7). What were the first impressions José Iraolagoitia has gained?

*This machine with its two variants with 8 spindles and 26 mm bar capacity or the 6 spindles and 32 mm bar capacity, perfectly meet our requirements. Everything seems to have been thought out with utmost care. It features the same characteristics as the 14 and 16 mm models. With the addition of Y-axes and 5 tools for back machining on top of the typical benefits of MultiSwiss, this machine will definitely be an extremely interesting alternative for the future. We are looking forward to discovering more of it.*





comes equipped with suitable peripheral devices that have specifically been designed and calibrated for it. The General Manager continues: *"The concept offers a very interesting operational autonomy and requires minimum maintenance. Once the machine has reached the operating temperature, it is extremely stable. The fact the machine uses the same oil for the hydrostatic system and cooling simplifies machine control. For instance, it is not necessary to monitor oil viscosity. The bar feeder is very easy to adjust and even if the choice of 1.5 m bars had astonished us at first, we have soon learned to appreciate its advantages: the ease of loading and changing bars and the added rotational speed provided by this solution contribute to increased machine performance. As usual, some minor adjustments are required to optimally customize the machines for them to be able to meet our demands; but as a whole, they prove to be very comfortable."*

#### **Extraordinary management system and employees**

High-tech machinery, is not the only component of Microdeco's success. As a Tier-1 supplier, Microdeco is solely responsible for the entire workpiece management. Microdeco delivers its parts straight to the production lines, which is an important factor of just-in-time manufacturing. Mr. Iraolagoitia explains: *"To achieve this, we have no alternative. Our organization must be simply perfect. Of course, we are ISO:9001 certified and have ISO:14001 and TS16949 certifications for the automotive industry as well as EFR certification (a Spanish certification that promotes work-life balance) for our internal organization. Our company is divided into small cells. These so-called mini companies (mC) have sole responsibility for the management system, its complete value chain and VSM (Value Stream Mapping),*

*its deadlines and its quality. Based on our experience, we are able to design bar turning solutions and to develop other technologies. Our expertise is complemented by a continuous investment strategy and a great flexibility in organizational adaptation,"* Mr. Iraolagoitia explains.

#### **Smooth service for the clients**

To satisfy customers at all times, Microdeco maintains an over-capacity of production knowing that the company cannot afford any interruptions. The General manager tells us: *"Quick response is of utmost importance. The MultiSwiss is 5 to 7 times as productive as a single-spindle lathe – or even more – while being able to produce parts of higher quality. That's a real asset both for us and for our customers."*

#### **Training and innovation**

The General Manager explains: *"For Microdeco, the staff plays an important role: the company places great emphasis on its training. When we implemented the new organization in our company, we*





became aware that we had to inform our staff as to where the company was headed, what strategy we wanted to adopt and how we wanted to achieve the reorganization. We spent a long time studying this aspect. Finally, we redesigned the company strategy around 5 main pillars: knowledge of the market and of the products of our customers, process and technology development, operational excellence, internal organization and culture as well as Industry 4.0.

In 2003, Microdeco received a special award of the EFQM European Quality Award for its commitment to social concerns and this year, we reached full EFQM reevaluation. When Microdeco was established back in 1963, we already decided to commit ourselves to social responsibility both towards our employees and the environment.

"Our customers, some of whom have been with us for 50 years, know that they can always count on our staff. We do our best for our customers and try to establish a long-term relationship. There's no doubt that our staff is our greatest strength and the collaboration with our customers and with Tornos at all levels has contributed to making us grow a bit every single day."



Microdeco Decoletaje de precisión  
Poligono Urtia, s/n  
Apartado de Correos 57  
48260 Ermua (Bizkaia)  
Spain  
Phone +34 943 17 03 17  
Fax +34 943 17 31 15  
Info@microdeco.com  
www.microdeco.com

### MICRODECO AT A GLANCE

Founded:	1963
Number of employees:	~200
Markets:	Automotive and medical
Diameter ranges:	2 to 34 mm, with priority on 15 to 26 mm.
Production sites:	Ermua (Sp), Bilbao (Sp), Oradea (Ro), Toluca (Mx) and Ermua-Medical (Sp)
Series sizes:	From 100,000 to several millions.
Certifications:	ISO 9001:2000, ISO 14001, ISO/TS-16949:2002, EFR
Awards:	Silver Q and Gold Q. Basque Country award for management quality awarded by the Basque government to companies that show an excellent level of management quality. Special award of the EFQM European Quality Award in recognition of Microdeco's corporate social responsibility.

# ONE-HUNDREDTH SWISSNANO SOLD IN SWITZERLAND

The Landmark is testament to the SwissNano's stability, precision and design.

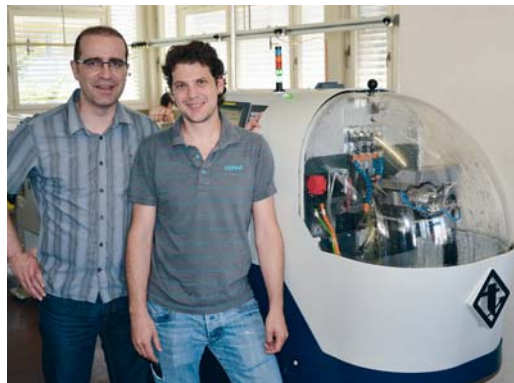


There's just no stopping Tornos' stable, precise and well designed SwissNano as the 100th machine was recently installed in Switzerland and users worldwide continue to become champions of this Swiss-type lathe.

Given its world premiere during the Tornos Watchmaking Days event in 2013 and specifically designed as a watchmaking and electronic components solution, the ultra-precise SwissNano also brings success to manufacturers in the automotive, medical and dental segments.

## A smart design

The SwissNano's compact footprint and design make it a head turner in any workshop, but its unique kinematics are what truly keep customers buying one SwissNano after the other. The SwissNano makes easy work of drilling, cutting, deburring, roughing and finishing operations and this helps watch manufacturers produce two-thirds of watch movement components—from simple to complex, all on one machine. Moreover, the SwissNano is just what the doctor ordered for the production of micro medical and dental parts with extreme quality



### THE ADVANTAGES OF SWISSNANO IN THE WORDS OF ITS USERS

**Stability and precision** – *“With automation of the assembly process, our customers are demanding not just very narrow tolerances, but also that we remain in the centre of this tolerance. Typically, on a stainless part with a tolerance of  $+2/-3\mu$ , we get results of PP 1.47 and PPK 1.27”.*

**Ergonomics** – *“I was not really in favour of this investment at the start, as I had no knowledge of the TISIS system, and the machine seemed too small to me. I was soon won over. The machine was easy to get to grips with and the quality of parts is excellent”.*

**Reliability and repeatability** – *“Dedicated to the watchmaking industry, the SwissNano meets its most fundamental requirements, i.e. exemplary stability and repeatability. It’s a machine you can really count on”.*

**Kinematics and options** – *“In our sector, parts are highly complex and to meet our customers’ requirements, we need to push our machines to the max. Up to now, the SwissNano has proven to be a very reliable partner. It allows us to meet our customers’ needs within the deadlines and to have perfect control of the desired level of quality. The machine is also highly compact and ergonomic, which is a real benefit in a small workshop such as ours. As far as I’m aware, it is the only machine on the market to offer this level of accessibility”.*

**Surface finish and quality** – *“Without a doubt, SwissNano machines are designed for micro production. The thermal stability and rigidity of every aspect of the SwissNano machine has been designed to reduce vibrations. We have noted that they both improve our surface finishes and increase the service life of our tools. The design of these machines also means they are remarkably quiet, with no vibration of the base”.*

**Suitability of the machine to the market** – *“If SwissNano machines had been available a few years earlier, we would probably have had more of them by now. For new parts, choosing the production equipment is simple: for very precise watch and micro-technical parts, the first-choice machine is the SwissNano”.*



and precision. While the design has caused a stir amongst customers, the practical aspects have also been well received. Professional users were unanimous. The 180° access to the machining area, the easy to remove protective 'bubble', the control on a mobile arm and the wireless tablet has won a clean sweep of confidence from customers. The SwissNano delivers superb ergonomics. It is accessible and it paves the way to easy set-ups. Furthermore, this solution can be used with a fixed/rotating guide bush or even with no guide bushing at all.

### Designed to boost quality and precision

Behind the SwissNano is a machine concept that guarantees exemplary balance. The thermal management allows operating temperatures to be reached rapidly, so users are quickly on their way to achieving perfect results. The machine has 6-axis kinematics that offers numerical settings in all dimensions. Users can benefit from all the operational comfort of a counter spindle on 3 linear axes. In addition to the counter spindle, the second platten can house tools under the counter spindle. This increases the SwissNano's machining capacity. Depending on the support, 2, 3 or 4 tools can be fitted under the counter spindle and this enables the machine to perform simultaneous operations on the two platens.

### Huge range of possibilities

Despite its simple appearance, the SwissNano offers outstanding machining options and is the most flexible machine on the market. The machine owes this flexibility to a large range of options which ensure it can meet anything the markets may require. For example, there is a device for milling threads and one for gear hobbing. If needed, the machine can also be equipped with high-frequency spindles.

### A replacement for cam-type machines

Even though the SwissNano machine was not originally specifically intended to replace cam-type machines, this is another factor making the SwissNano a real hit with customers. The ease with which it replaces manual CAM machines worldwide is becoming more evident as it becomes increasingly difficult to find operators for CAM machines. The SwissNano is a true hero as it answers these customers' needs in terms of applications. The small







footprint also means customers can replace their old manual MS7 machines, one by one with CNC-driven machines.

### Positioning on the global market

Seventy percent of SwissNano customers have more than one machine of this type, and this number is growing as customer satisfaction and requirements also grow. When it comes to worldwide distribution, Marketing Manager Brice Renggli explains: "With 100 machines sold in Switzerland, this market is clearly the largest for the SwissNano right now. It is also the first market where we introduced the machine. Subsequently the watchmaking industry responded immediately and extremely positively to the machine. Today, we have seen SwissNano machines installed around the world. Machines are operational in Europe, Asia, Russia and even Australia. The advantages of the SwissNano have truly won plaudits from across the planet".

### TISIS: customers' portal to Industry 4.0

In parallel, the SwissNano is supported by Tornos' TISIS and TISIS CAM. This is the customers' portal to the world of Industry 4.0. As a computer-aided manufacturing solution, TISIS CAM was specially developed to help Tornos customers tackle complex operations. At the same time, it reduces start-up time significantly and it is the perfect solution for efficiently programming and optimising parts. TISIS CAM is especially useful when it comes to exploiting the full potential of the SwissNano.

### A renowned suite of services

The SwissNano is backed by the renowned Tornos Service structure. This delivers true value throughout the full product life cycle of each Tornos machine. The productivity-enabling services include start-up assistance, expert training and coaching, free hotline, on-site operations support and preventive maintenance, original spare parts delivered world-wide, 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.

To find out more about the SwissNano, visit the micro-site: <http://watchme.tornos.ch>



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Tornos SA  
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LNS Turbo SFcompact

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Tornos

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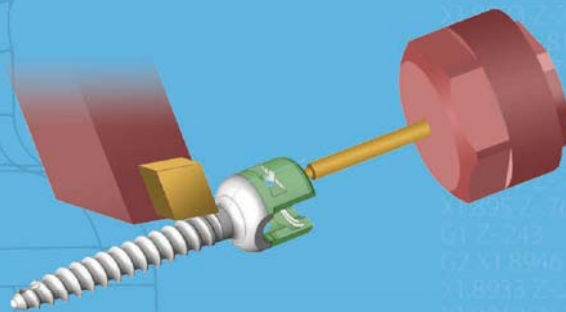
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## EXCEEDING EXPECTATIONS EVERY TIME

**For Supreme Screw Products President and owner Misha Migdal, exceeding customer expectations—every time—is more than a brand promise.**



It's a mission that the Plainview, New York-based manufacturer of high-quality precision screw machine products lives and breathes every day. That mission is apparent throughout Supreme Screw Products—from its modern, 2,230 square-meter facility and highly trained, 50-plus member staff, to its growing fleet of Tornos turning machines.

Supreme Screw Products (SPP) moved into its Plainview facility in December 2015, leaving behind a cramped, 1,115 square-meter workshop in the Bronx, New York's northernmost borough. The company's new climate-controlled quarters has workshop oil mist extraction as well as climate control to defeat temperature fluctuations, a layout that enables a lean manufacturing approach, a well-

appointed conference room—and room to grow. The new site represents another step forward in Mr. Migdal's lifelong dream.

*"It had always been my dream to own my own business, to be on my own and to build a business up over time," he explains.*

### **Entrepreneurial path**

In fact, he was on that path long before he became an SPP partner in 2003 and acquired his partners' interest in 2008. After earning his bachelor's degree with a focus in technology, he was working for a manufacturer in Israel in 1996 when his employer sent him to Tornos headquarters in Moutier,





Misha Migdal, CEO



Switzerland for training on Tornos' Deco machines. Four years later, Mr. Migdal moved to the US and Tornos offered him a job as a machine technician. Over the next three years, he became an expert's expert, rising to the position of Senior Service and Application Engineer with Tornos.

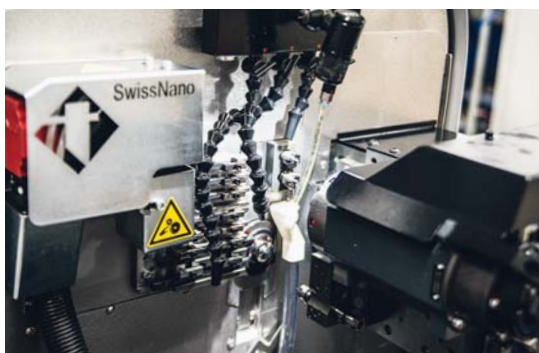
*"I programmed machines, trained customers and Tornos technicians, and set up turnkey projects for customers,"* he explains, crediting his expertise with Tornos machines for making it possible for him to pursue his entrepreneurial dream. *"My experience with Tornos machines has done more than serve me*

*well: I would not be able to do what I'm doing without it. I know these machines inside out and that allows me to think outside of the box of standard applications."*

### Expert's expert

His deep understanding of Tornos machines gave Mr. Migdal a competitive edge, too. It's no exaggeration to call him an "expert's expert" when it comes to Tornos technologies.

*"This allows me and my team to start approaching customers who weren't thinking of typical products that could be machined on Swiss machines. That, in turn, positions us to advise our customers on more efficient and productive ways of executing their parts,"* he says. *"In fact, our partners at Tornos are sometimes surprised at what we can do with our Tornos machines."*



### Embedded expertise

That technical knowledge is something Mr. Migdal transfers to every new hire, an investment that continues to pay off for his customers and for his business.

*"We have to train every person we hire. Even people who come to us with a computer numerical control (CNC) background need six months to a year before they are productive for us. That's because the Tornos machine concept is completely different from most CNC machines,"* he says. *"Training is something we do right; we invest a lot in our employees."*

### Exceeding expectations

The machining expertise embedded throughout SSP's workforce—along with a commitment to extracting every last bit of performance from each



Paul Zharebtsov, Production Manager



of the Tornos machines on his shop floor—makes it possible for the company to build on its promise of exceeding customers' expectations without exception.

Case in point: Just five years after breaking into the highly regulated and competitive medical manufacturing segment, SSP is the partner of choice for producing high-precision components for the breakthrough platform for robotically assisted minimally invasive surgery. Just how precise? A needle for that system can be as small as .8 mm in diameter, 1.2 mm in overall length, with unique characteristics mandating part tolerance of .002 and surface finish of around Ra 32.

### Without limits

*"We are making parts on our Tornos Swiss machines that many people wouldn't even approach," Migdal says. "My philosophy is: Whatever shape the part is—round, square, polygonal, whatever—we can make it if we can fit it within the diameter of the Tornos machine. We find a way around limitations."*

Along with continuously extending the potential of its fleet of 16 Deco and three EvoDECO machines, SSP recently became a fan of Tornos' SwissNano, which was installed at the company's new Plainview location in December 2015.

*"We struggled with some applications on our DECO machines—until we got the SwissNano and it's doing exactly what we need it to do," he says.*

### Rising to the challenges

A new facility, a booming business in growing market segments including medical technology which now accounts for 50 percent of SSP's projects, and a recent 20 percent increase in his workforce may

seem like a lot of responsibility, but Mr. Migdal wouldn't have it any other way.

*"It is a lot of responsibility, but if I were afraid, I couldn't rise to the challenges," he says.*

When he steps back and takes a look at SSP, he is most proud of his employees, who "put their hearts and souls into this business." It helps, too, to have partners like Tornos who transcend the typical customer/supplier relationship.

*"In particular, Tornos Technologies' (US) Applied Technology Manager Paul Cassella, Assistant Service Manager Mike Callhan and Service Manager Roland Schutz deliver great support," Mr. Migdal says. "We are running two extended shifts and lights out, and we can call them anytime. Tornos is always ready to help us. That's the difference between a run-of-the-mill supplier relationship and a real partnership."*



### Supreme Screw Products, Inc.

Supreme Screw Products, Inc.  
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## ALMAC BA 1008HP – THE IDEAL MACHINE FOR DEEP-HOLE DRILLING

The Almac BA 1008HP machine launched at the beginning of 2016 and presented at the Siams exhibition is an awesome means of producing components that require deep holes with small diameters.



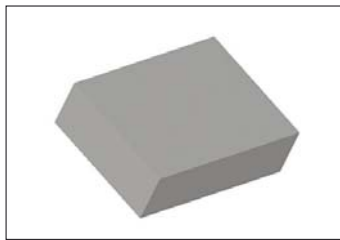
Considering the machine was developed for machining watch bracelet links, it's really no surprise. Components that need deep-hole drilling with depths of 10 to 15 times the tool diameter can be easily processed on this exciting new machine.

### **BA 1008HP – high pressure included**

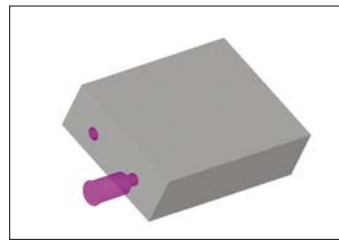
In the previous Deco magazine edition, we presented the BA 1008HP and described the main features of the machine. The BA 1008 machine version has a high-pressure coolant system (120 bar) and



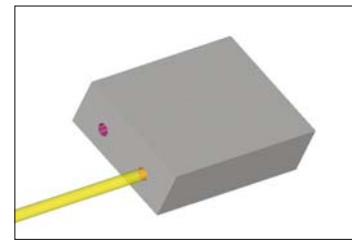
## The present



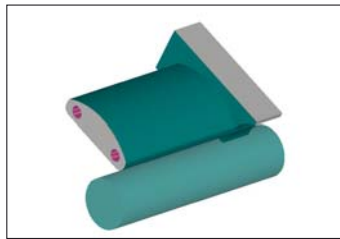
1 - Bar feed (1 sec)



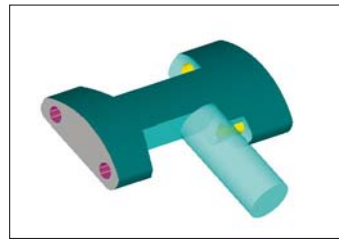
2 - Spot drilling (2 sec)



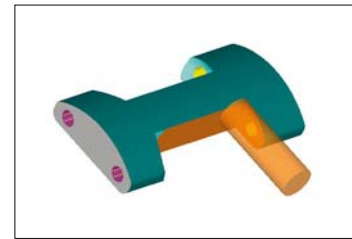
3 - Deep-hole drilling  $\varnothing 1.35 \times 20$  mm, HP coolant supply through the tool (5 sec)



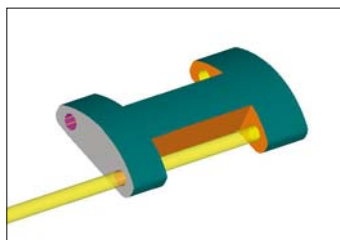
4 - Roughing the external shape (90 sec)



5 - Roughing the lateral shape (40 sec)



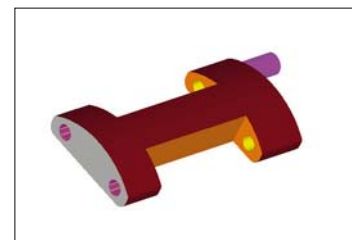
6 - Finishing the lateral shape (35 sec)



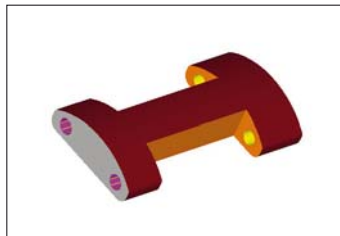
7 - Deburring the holes (5 sec)



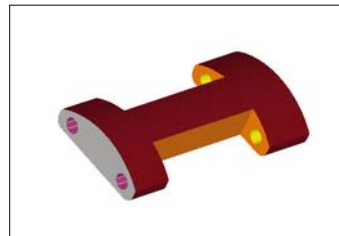
8 - Finishing the external shape (50 sec)



9 - Deburring the rear side (3 sec)



10 - Cutting off (5 sec)



11 - Ejection (1 sec)

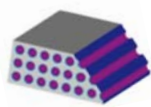
### SPECIFICATIONS OF THE BA 1008HP MACHINE

Travels: X/Y/Z	26/160/60 mm
Travels: U/V/W	26/160/35 mm
Max. bar diameter	16 mm
CNC unit	CNC Fanuc 0imD
Mechanical spindle	12,000 rpm
HF spindle	28,000 or 80,000 rpm
Spindle with through-spindle coolant	28,000rpm
Coolant supply through the spindle	High pressure – 120 bar
Dimensions	998 x 3200 x 1600 mm

allows drilling with through tool coolant supply. This is an undeniable advantage in terms of chip discharge and it delivers a considerable increase of drilling speed and quality.

### Drilling speed

The Almac experts have performed a large number of machining tests since the machine was introduced. The results enable high drilling speeds to be achieved. On a golden link, Ø1.35 mm holes with a depth of 10 mm could be realised at feed rates of 1.2 m/min. With 316L stainless steel, Ø1.35 mm holes could be realised at feed rates of 1 m/min with a depth of 10 mm and at 800 mm/min for a depth of 20 mm.



Deep-hole drilling test performed on a bar made of 316L stainless steel: 24 holes with Ø1.35 x 20 mm.

Spot drilling time: 22 sec (1 sec/hole)

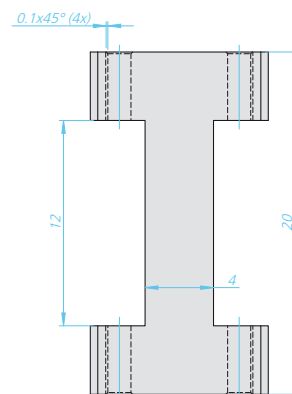
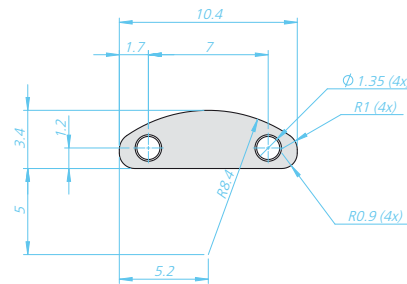
Drilling time with through-the-tool coolant supply: 54 sec (2.25 sec/hole)

### Sample machining

At the PMT/EPHJ 216 exhibition, the capability of the BA 1008HP machine was showcased machining a H-shaped link. Starting with a 15 x 6 mm 316L stainless steel bar, the link could be produced in 240 seconds.

The following overview of the machining processes shows how with high-pressure coolant supply through the tool, the four holes on the front and rear side of the component are directly drilled into the raw material in a single deep-hole drilling process. Besides the time saving obtained through the high drilling speed, the fact that the holes can be drilled in one drilling cycle allows two further advantages. On the one hand, the cycle time is reduced through fewer set-ups and on the other hand, a perfect alignment of the holes is achieved.

Please note that the machining time can be reduced further if a profiled bar is used instead of a rectangular bar. This is because any roughing and finishing processes on the external shape of the workpiece can be omitted. The workpiece can reasonably be machined in less than 100 seconds.



All these benefits make the BA 1008HP the ideal production machine for this kind of workpiece.

Are you looking for a similar machining solution?

The Almac experts will be pleased to help you and to analyze your specific requirements. Do not hesitate to contact them to discuss the possibilities.



Almac SA  
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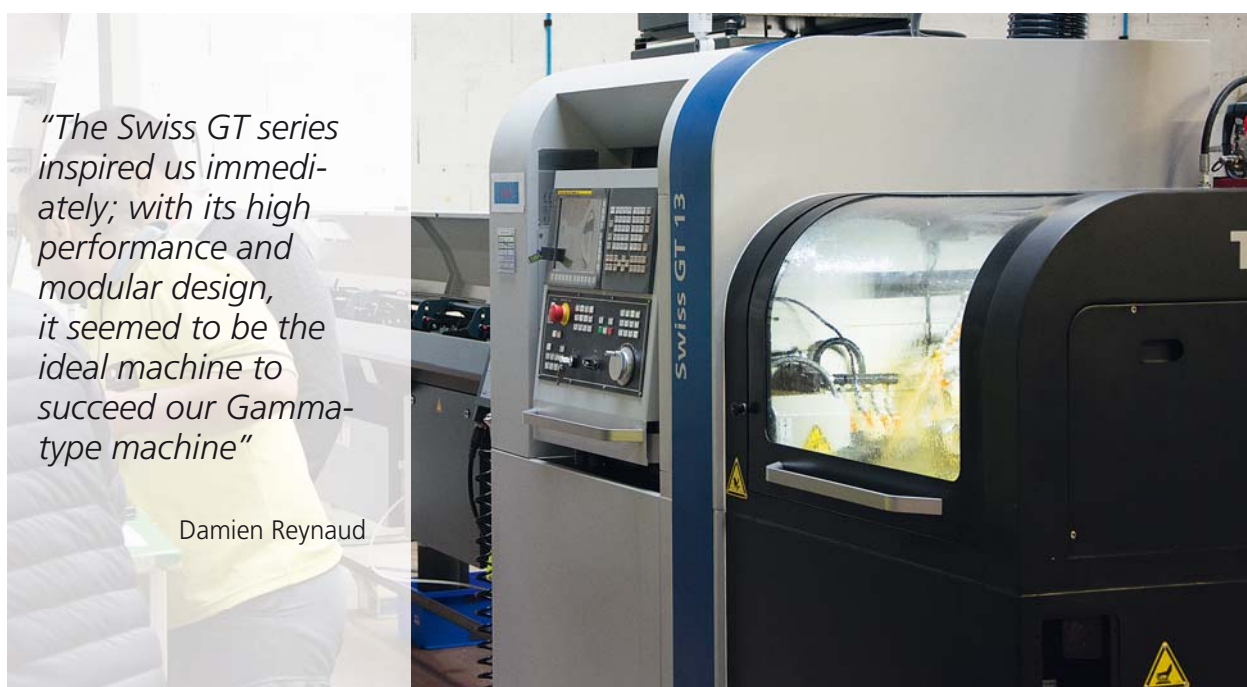


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P R E C I S I O N C A R B I D E T O O L S

## A MEDICAL SPECIALIST RELIES ON TORNOS PRODUCTION MACHINES

Headquartered near Lyon in France, Fabmed was established in 2011 by a team of dynamic and highly qualified engineers from the medical industry. Ever since the company was formed, the SME has experienced exponential growth. To address the multiple challenges posed by medical parts, Fabmed relied on Tornos from day-one to advance its activities.



*"The Swiss GT series inspired us immediately; with its high performance and modular design, it seemed to be the ideal machine to succeed our Gamma-type machine"*

Damien Reynaud

### A multi-functional machine pool

The business started with one Tornos Deco 13 and one Deco 20 that had both been bought as used machines with the aim of having two flexible machines that were able to produce implants and ancillary screws with particular ability to perform deep-hole drilling processes. This choice immediately proved to be successful and the investment enabled the company to open up new markets. To enhance its production capacity, Fabmed then bought a Tornos Gamma 20. This machine that can be used for thread whirling was added to the workshop to process osteosynthesis screws. This purchase was followed by the acquisition of a Deco 10 and a Delta 12 for the dental market. A second Deco 13 completed the pool of production machines and

enhanced the capabilities of the company in terms of the production of ancillary equipment in which Fabmed has gained a well-known expertise.

### Deep-hole drilling skills

Deep-hole drilling is an issue well-known in the medical industry. It is a real challenge that Fabmed perfectly meets, now becoming one of the company's specialities. Many companies use deep-hole drilling processes but few are truly proficient. *"In our field, it is not an option to buy bar stock; you have no choice if you want to be competitive and so we have to perfectly master this technology,"* underlines Mr. Damien Reynaud, Fabmed's Managing Director.



## Presentation



Fabmed: A dynamic staff at your service.



Ancillary devices and various products made by Fabmed.

### An expert team to meet any challenge

Fabmed consists of 8 specialists that previously worked for large OEM groups and decided to pool their expertise. The Fabmed team now makes its knowledge available to the most demanding manufacturers in the medical industry. With its workshop equipped with state-of-the-art measuring and monitoring technology, the company manages all required monitoring and finishing operations. With its ability to machine bar stock with diameters from 3 to 32 mm in any type of material that includes challenging materials such as cobalt-chrome but also titanium, stainless steel, plastics and various polymers, Fabmed is specialised at undertaking the

most complex requirements in the medical sector. Fabmed produces everything from prototypes and small batches through to production runs with a highly flexible and responsive manner. The company is certified in accordance with ISO:9001 and ISO:13485 (section 7.3 not applicable).

### The Swiss GT 13 – an evident choice

*"The Swiss GT series inspired us immediately; with its high performance and modular design, it seemed to be the ideal machine to succeed our Gamma-type machine," Mr. Reynaud says. "With its two independent tooling systems, it is easy to handle for all our operators. Despite this high ease of use, the machines are flexible and efficient and are suited for the production of complex parts, especially of snap-off screws and osteosynthesis screws. The modular design of the rear gang tool post on Swiss GT machines allows the installation of a thread-whirling cutter or an inclined milling device that is very useful for the dental sector. We also benefit from the peripherals offered by Tornos. The 20 - 140 bar pump perfectly meets our requirements and we could also have a high-frequency spindle installed for back machining tasks that especially enables us to machine Torx profiles. We decided in favor of the Swiss GT 13 because of the small diameters we had to machine with it. For our current needs, the Swiss GT 26 model was a bit oversized, but we will keep an eye on it, especially due to the compatibility of the options for both machine types."*

### Excellent accessibility

The machining area is large and the access to the rear of the machine is improved by the door that is provided for this purpose. The tools and the rotary

### MACHINE POOL

7 CNC machines:

- 1 Tornos Deco 20 machine
- 2 Tornos Deco 13 machines
- 1 Tornos Gamma 20 machine
- 1 Tornos Delta 12 machine
- 2 Swiss GT 13 machines



A Swiss GT 13 while machining a snap-off screw.

attachments can be changed in no time. In addition, the TISIS software enables the customer to create the machining programs during production which makes program monitoring very easy and thus considerably simplifies machine operation. 2D simulation of the shape helps the operator to a great extent. *"TISIS is an excellent solution and a clear advancement of the former ISO Editor that we are still using for our Gamma-type machine,"* Mr. Reynaud declares and he adds: *"Thanks to various support functions, program visualisation and monitoring are much easier and programs can be written in a more intuitive manner. For a company like ours, this is a clear advantage. TISIS is rapidly advancing and since we have purchased our 2 Swiss GT 13 machines we could notice how several software updates have made our everyday work easier."*

#### World-class performance

*"For nearly 6 months now, we have been using the Swiss GT 13 machines for production, and we are very satisfied with the results. With these 2 machines, we have found profitable partners for our business activities. Moreover, thanks to their compact design, the machines can be easily integrated in our workshop and they enable us to promptly*

*respond to the various requests of our customers. Aside from the machines, Tornos is a reliable partner for us. The service is excellent and the software hotline support offers efficient help should any problem arise,"* the Managing Director concludes.



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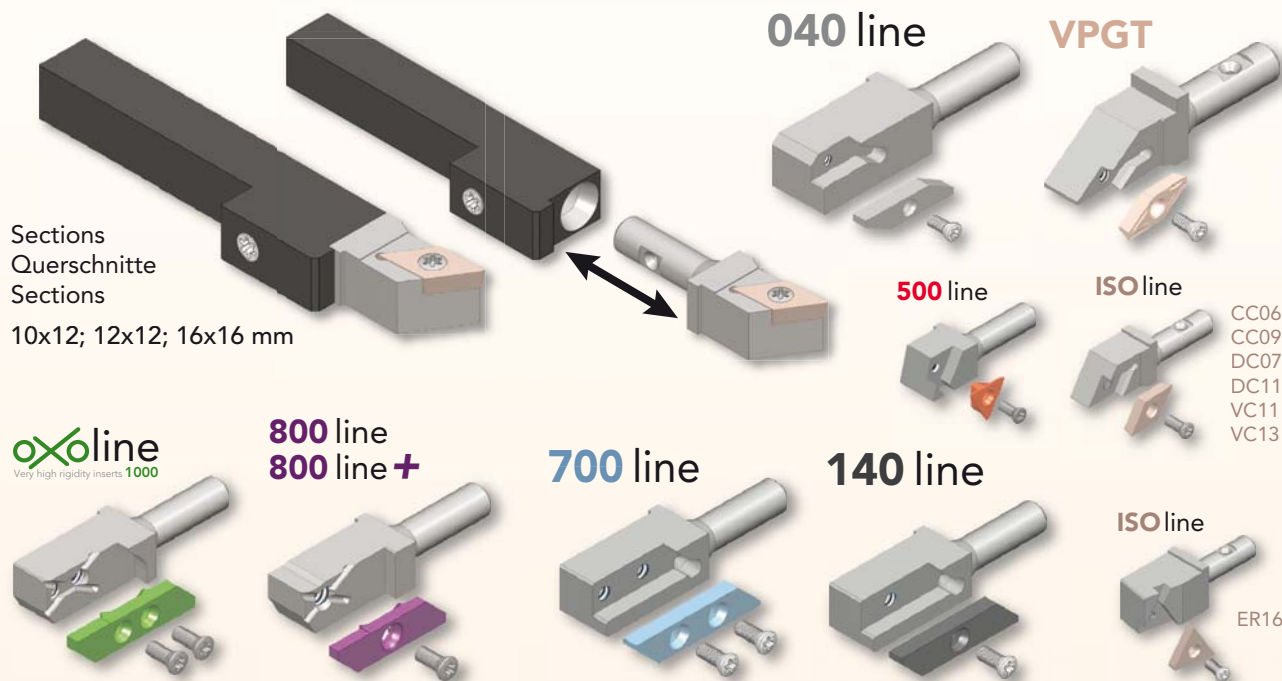


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## TORNOS IS NOW EXPANDING ITS MACHINE OVERHAUL PROGRAM

As productive as on the very first day!



After machine overhaul including repainting and new marking, the customer virtually gets a new machine.

After a machine tool has dutifully served its purpose for years on end, the risk of failure rises. Added to the potential for unreliability is the decline in productivity and precision, especially when compared to new technology. So, after ten to fifteen years, the question usually arises: 'Shall we invest in a new machine or have the old one overhauled?' Tornos painstakingly analyzes the customer's situation, considers all factors and suggests a customised solution. More and more often, it turns out that the best suited strategy is to overhaul the machine.

If properly maintained on a regular basis, a Tornos machine will still perform reliably and productively

even after 60,000 or more operating hours. After this period, it is time to think about a successor. However, the machine is just the visible tip of the iceberg in the production process. The entire package such as the equipment, tools, pre-setting systems and last but not least training and programming courses are also elements that should not be overlooked by the customer. After replacing a machine, the production process will practically start from scratch and it will take some time until a new machine will reach its full productivity. Therefore, the Tornos Service department has been offering an economically attractive alternative through its machine overhaul program and also the supply of used machines.



## The present

### Expertise with original parts & components

The Tornos service engineers have unparalleled knowledge of the machines and the customer base and this enables the engineers to prepare a customised offer with a fast turnaround. The required performance parameters and the related necessary measures will be defined jointly in a completely transparent manner. On this basis, a concrete offer will be made indicating the precise scope of the performance expectations and the schedule. As a rule, the Tornos machine overhaul program will comprise the following works as part of a complete overhaul:

- Complete machine disassembly
- Cleaning of all components and parts
- Replacement of guideways and ball screws
- Renewal of cables, motors and pneumatic system
- Repainting of the machine and its components
- Assembly of the machine, adjustment of the geometry and test run of all axes
- Re-commissioning with functional and geometry warranty

For the customer, this offers the confidence that the machine is overhauled at the manufacturer's plant and the service staff can fall back on the expertise and also the original parts. If just a partial overhaul is required based upon the status analysis with the customer, this process can often be conducted at the customer's production plant.

### Upgrade and warranty

Over the years, Tornos has developed numerous machine-specific options and additional functions that make new machines operate even more productively and more precisely. In the course of regular preventive maintenance, these cannot always be retrofitted. However, within the scope of overhauling an older machine, such retrofitting will definitely make sense. Example: For some time now, a cyclically operating central lubrication system has been integrated in the Deco 10 machine that can be controlled via the machine's control unit.

Following the machine overhaul including repainting and machine labeling, the machine delivered to the customer thereafter is virtually as good as new. This is mainly of interest to customers that don't want to just upgrade the machine to state-of-the-art levels, but also attach importance to aesthetics and design. With a machine from the Tornos machine overhaul program, you will receive machines truly in 'mint' condition at a significantly lower price compared to buying a new machine. Tornos also grants a warranty of one year on all parts replaced and works carried out.

### Customer-oriented machine overhaul

Even the older Tornos machines are of excellent basic quality. By way of the overhaul program combined with upgrades, the machines will become better than ever before. Thanks to the long-standing experience of the company in developing and constructing machine tools, the specialist staff expends their technical competence from across the generations. The required time frame naturally depends on the degree of upgrading. For a complete overhaul including repainting, assembly and commissioning, Tornos will need between five and six weeks. As with all the mentioned issues, the distinctive service-minded attitude of Tornos is reflected in the machine overhaul program. Schedules and deadlines can be closely coordinated with the customer, so work can be coordinated in times of slack orders or holiday seasons. With its machine overhaul program, Tornos once again impressively underlines its customer orientation and close partnership with turned part manufacturers

# TORNOS

Tornos SA  
Industrielle 111  
2740 Moutier  
Tel. +41 32 494 44 44  
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[www.tornos.com](http://www.tornos.com)

# DÉCOLLETAGE DE LA CASCADE – UNCOMPROMISING QUALITY AND RESPONSIVENESS

**Décolletage de la Cascade is a company headquartered in the French village Magland, a beautiful setting in the rue de la Cascade with a magnificent waterfall. The company employs a highly responsive staff with exceptional know-how and this is backed by an ultra-advanced machine pool that caters for the diverse demands of its customer base.**



Mr. Thevenet and Mr. Amal Nepaul in front of the Swiss GT 13, the machine purchased last by Découlletage de la Cascade.

Since the company was formed, it has been relying on Tornos as its supplier of CNC machines. Success story.

## Quality and responsiveness

The motto of Découlletage de la Cascade is rather simple; the company produces parts of uncompromising quality within the shortest possible lead times. As Managing Director, Mr. Thevenet emphasises: *"It's no problem for us to work on the weekend if a customer needs our help. We will be glad to do so because for us, it is important that our customers are satisfied at all times. Given the tough and rather volatile market and the fierce competi-*

*tion with the Eastern or Asian countries, we have focused our efforts on becoming the real champions of responsiveness. This is about making our team of specialists fit to make a difference. Sometimes, when a customer calls, we can be setting up the machine just after the call ends."* Découlletage de la Cascade processes all types of materials from brass (with or without lead), copper and even the toughest stainless steels, plastics and polymers.

## A pioneering company and staff

Décolletage de la Cascade is active in sectors such as luxury goods, the gas industry, connectors, rail and also the aerospace industry. The company exports



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more than 30% of its production to European countries as well as the United States. The company has a flexibility that is rare with a machining capacity that ranges up to diameters of 55 mm.

### Tornos and bar turning at Décolletage de la Cascade

It all started when the company bought a Tornos ENC 164 back in 1991. This machine was primarily used for the connector business. It was soon joined by some sister models. This was the beginning of a close partnership between Tornos and Décolletage de la Cascade. The company then moved to Deco machines with the Deco 20, then the Deco 13 and finally the Sigma 20 and Sigma 32. In 2008, after the company had briefly switched to a competitor, Mr. Thevenet decided to return to Tornos. This decision was based on excellent support from the French branch of Tornos. Based on the positive experience with the large fleet of cam-type lathes, the company decided to purchase some Delta machines in 2008. With a fleet of ten Tornos machines, Mr. Thevenet is really happy: *"For us, they have been an efficient and down-to-earth solution that has perfectly met our requirements. In 2013, when Tornos stopped the production of its Delta series, we decided to continue with the CT20 machine."*

### CT 20 – a robust partner

*"The CT20 machine is an appealing, more powerful and robust successor to the Delta machine; it gives the impression of real durability. With more tools than the Delta machines, this small machine has satisfied us right from the start. It is faster and it boasts an impressive machining capacity. It can be equipped with up to 10 driven tools whereas the Delta machines were limited to 3 or 7. The CT 20 has opened up new possibilities for us. The CT 20 is able to relieve some of our workload from the more advanced Sigma machines. At the moment, we manufacturing a component made of ETG 100 steel; we tried to machine it on one of our Delta 20 machines but unfortunately, it's the drilling performance were not sufficient. As our Sigma and Swiss GT 26 were occupied, we repeated the attempt with one of our CT 20 machines and the machine proved ideal in terms of clamping force and performance. We were impressed with the advancement Tornos has achieved with the CT 20. With our CT 20 machine, we really have a premium product,"* Mr. Thevenet continues.

### Swiss GT 26 – A welcome addition

Décolletage de la Cascade has been looking for a rather simple machine that could be equipped with special attachments to meet diverse customer requirements. With the arrival of the Swiss GT 26 machine, new avenues opened. The Managing Director explains: *"The idea of purchasing a Swiss GT 26 machine had been crossing our minds for quite a long time. When we were asked to machine*



Manu while setting up the CT 20.



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*an extremely complex component, we sought Tornos help to carry out studies on their new Swiss GT 26. We got a quick and positive response from Tornos. The machine proved ideal for our needs, particularly with its rear tool post that can accommodate various special attachments. The Swiss GT 26 is an important asset and perfectly rounds off our workshop. It even allows working without guide bush. As we had been rather unfamiliar with the machining without guide bush, we were astonished about the ease of use of the system of the Swiss GT 26. Tornos said the process would take 15 minutes. We were a bit skeptical about that, but it is really true."*

### Swiss GT 13

In view of the success with the Swiss GT 26, it is not surprising the bar turning specialist has been interested in the Swiss GT 13 machine as well: *"For quite a long time now, we have been looking for a high-capacity machine for small diameters. With maximum speeds of 15,000rpm and a similar concept as the Swiss GT 26, the purchase and use of a Swiss GT 13 has proven a wise decision."*

### FLEET OF SWISS-TYPE LATHES

Numerous cam-type lathes

26 CNC machines:

- 4 Tornos Sigma 32 machines
- 1 Tornos Sigma 20 machine
- 9 Tornos Delta 12/20 machines
- 1 Tornos Delta 38 machine
- 1 Tornos Swiss GT 13 machine
- 1 Tornos Swiss GT 26 machine
- 2 Tornos CT 20 machines

#### Refinishing workshop

- Transfer centers by Wirth et Gruffat
- Lathes
- Milling machines
- Tapping machines
- Drilling machines
- Slotting machine

#### Mechanical workshop

- Lathes
- Milling machines
- Drilling machines



Décolletage de la Cascade  
Thevenet Michel & Fils  
56 Impasse de la Cascade,  
74300 Magland,  
France  
Phone +33 (0)4 50 34 78 84  
Fax +33 (0)4 50 34 75 03  
[www.decolletage-cascade.com](http://www.decolletage-cascade.com)  
[ddlc@decolletage-cascade.com](mailto:ddlc@decolletage-cascade.com)

# IN-Line

2016





A close-up photograph of a hand spinning a red and white striped top. The top is in motion, creating a blurred, circular trail around its base. The background is a soft, out-of-focus grey. A large, semi-transparent yellow shape is on the left side of the image, partially covering the text.

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