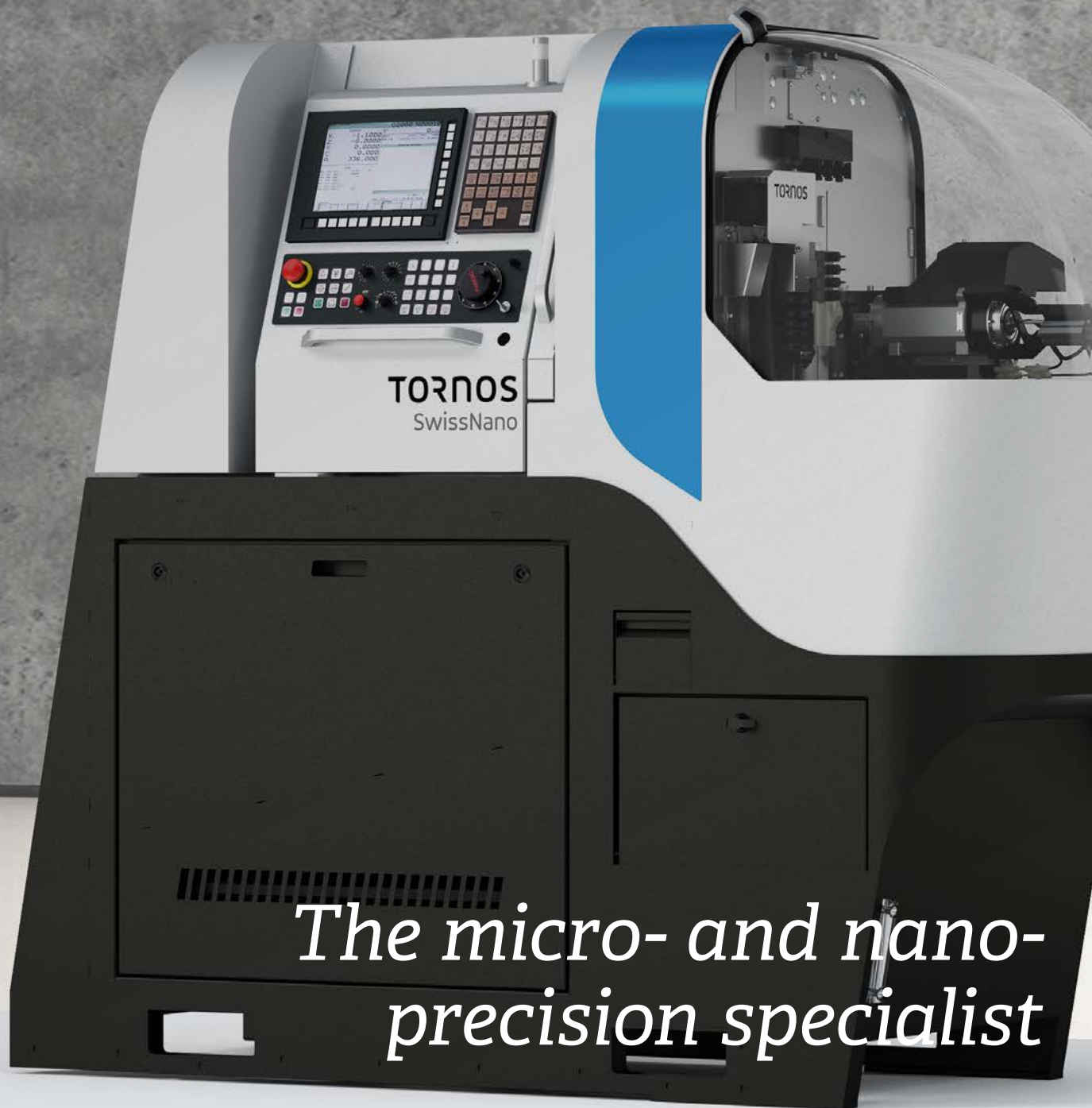


# TORNOS



TORNOS  
SwissNano

*The micro- and nano-  
precision specialist*

SwissNano

# The micro- and nano-precision specialist

## SwissNano

The SwissNano range is designed to meet the demand for small parts requiring very high precision. The kinematics of the machine enable it to produce the majority of turned parts of a watch movement, from the simplest to the most complex, including cutting, with excellent finishes. Its capability extends beyond horological applications to include the medical, dental and connectivity business sectors, and any type of part requiring extreme quality and precision.



6 Linear axes  
C axes 2  
Maximum diameter 4 mm  
Maximum number of tools 13  
Maximum number of rotating tools 4  
SwissNano 4



6 Linear axes  
C axes 2  
Maximum diameter 7 mm  
Maximum number of tools 18  
Maximum number of rotating tools 5  
SwissNano 7



# Small is beautiful

## High precision

The innovative design of the SwissNano provokes unique emotions. Another layer is added to this small, ultra-high performance machine with the option of customisation in eight different colours.

### Precision

- Offering the highest precision on the market, it meets the most exacting watchmaking requirements.
- A symmetrical cast iron structure provides the machine with excellent rigidity which allows it to achieve superior finishes and extends the service life of tools.
- Unrivalled thermal stability thanks to a short thermal loop and comprehensive and active machine thermal management
- Modular machining area adaptable to the part requirements

### Performance

- Capably carries out operations with high added value, including gear hobbing, polygon operation, thread milling and internal and external thread whirling.
- Various positions for rotating tools, optional high-frequency (HF) spindles are available.
- Various part recovery systems enable fragile and/or small parts to be extracted using a vacuum.
- Excellent reliability

### Productivity

- Kinematics with 6 linear axes and 2 independent tool systems enable turning and drilling, cutting/deburring and roughing/finishing operations.
- Fixed guide bush, rotating or operation without guide bush

### Ergonomics

- Ergonomics and visual access to the machining area over 180 degrees facilitates tool adjustment.
- Minimum footprint requirement: 1.1 m in front of the machine with bar feeder and a width of 0.65 m. The SwissNano is as compact as a cam-type machine.
- The counter spindle on 3 numeric axes enables fine adjustments to be made to the machine.

### A unique concept

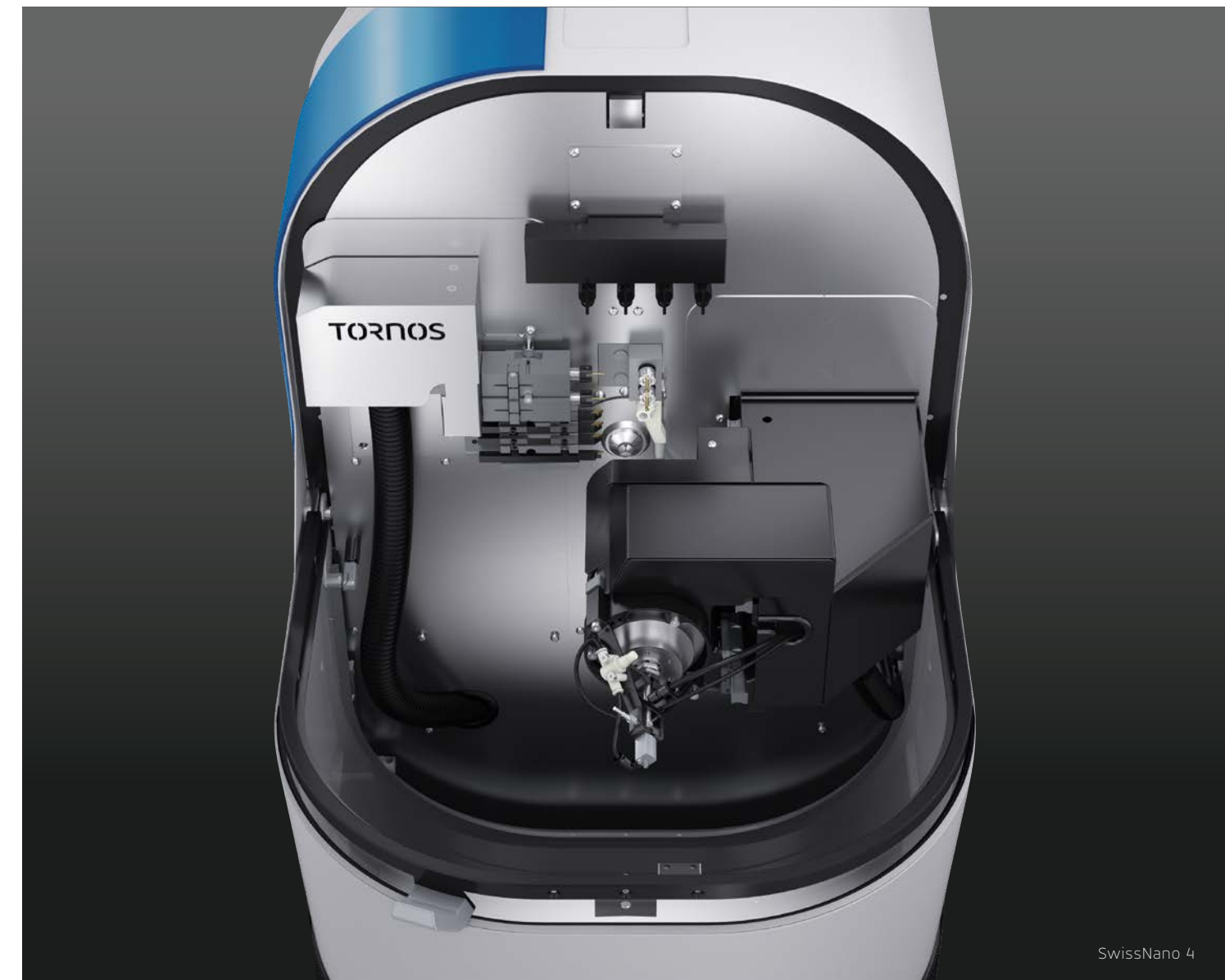
The SwissNano features a counter spindle on three linear axes. This solution gives the machine a unique advantage: with adjustment and tool centering operations located under the counter spindle, centring the counter spindle on the guide bush or tools in counter operations is extremely easy for the operator.

The SwissNano's unique design offers perfect access to the tools and allows the operator to

stand facing the guide bush. In order to perfect such unique ergonomics, the operator benefits from a control panel on a swivel arm fitted with an electronic handwheel.

### Minimal energy consumption

In order to minimise the machine's energy consumption, the power of the spindle and counter spindle has been optimised. As a result, the SwissNano consumes significantly less energy than its direct competitors.



# Foolproof repeatability and precision

## 16,000 rpm

Reliable, precise, and ergonomic, the SwissNano enables you to respond to the most demanding precision machining requirements. The SwissNano had to be able to produce the majority of turned parts of a watch movement. The machine had to satisfy the most exacting precision and dispersion requirements whilst guaranteeing high quality finishes and allowing the user to remain competitive on the market. The result of this equation is a machine that is unique in many ways. It all starts with the heart, the symmetrical cast iron frame benefiting from small thermal loops. Its rigidity has been optimised in order to guarantee flawless finishes. The machine heats up extremely quickly and does not need to be preheated after a setup change. The first part comes out perfectly, the heat dispersion is very low and the precision of the machine is consistent throughout production.

The machine's 6-axis kinematics offer numerical settings in all dimensions. The user comfort offered by the counter spindle, mounted on three linear axes, is unique to the market. In addition to the counter spindle, the second platen can house tools under the counter spindle, further

increasing the SwissNano's machining capacity. Depending on the support, two, three or four tools can be fitted under the counter spindle, enabling the machine to perform operations in parallel on the two platens.

The SwissNano is the only machine on the market able to make such a simple conversion; you can switch from working with a guide bush to working with a collet in a matter of minutes. The machine is simple to use: Its TMI interface fully automates switching between fixed and rotating guide bushes or no guide bush at all. The operator simply selects the preferred setup in the interface, and the machine automatically makes all of the necessary adjustments. This option further demonstrates the machine's flexibility and truly makes it the perfect partner for machining small components requiring extreme precision.

## Small footprint of 1.2 m<sup>2</sup>

# Unique machining operations

The kinematics of the SwissNano are specially designed to produce small parts with high precision requirements. The symmetrical cast iron structure provides the machine with excellent rigidity and the ability to achieve superior finishes.

Cutting and deburring

Roughing and finishing

Turning and drilling

# The possibilities are endless

## Thread milling device

Occasionally used as a polygon unit, but more often as a device for milling threads on small screws, this device can be fitted as a tool that successfully performs thread chasing operations. It is possible to achieve very fine threads (S 0.5). To see this operation in more detail, go to our YouTube channel where you can admire the work-piece being machined up close.



Screw video

## Gear hobbing

The SwissNano not only performs turning, milling and polygon operations; it can also perform gear hobbing.

This means it can greatly simplify the value chain of your production by performing extremely competitive cutting operations.

Now this complex operation can be performed on a single machine.



Hobbled cannon pinion video



Second pinion video

## High-frequency spindle

As a special modification, the SwissNano can be equipped with high-frequency spindles, in operation or counter operation to suit the part requirements. The machining of a double plate with two front-mounted spindles is one of the most difficult parts to produce on a bar turner and, as you will see in the video, the SwissNano does a marvelous job.

In addition to high-frequency spindles, the SwissNano can also be equipped with one or two mechanical drills for performing drilling or milling operations. There is also the option of performing splitting operations.



Double plate video

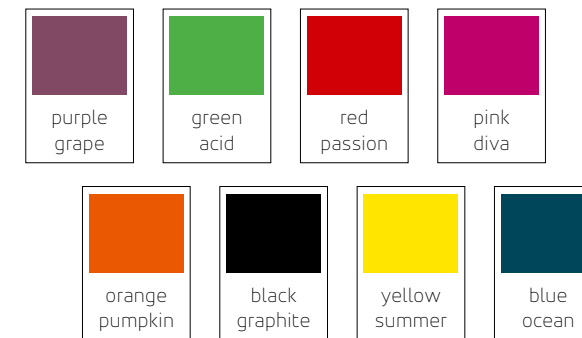
## Vacuum

With the vacuum option, the parts are extracted and collected in one of the oil bath baskets to avoid marking.



## Customisation

Unique machine, unique design and unique customisation options. We can customise your SwissNano according to your requirements and wishes; choose from our range of colours or contact us to create a unique model.





# Produce more parts per square meter

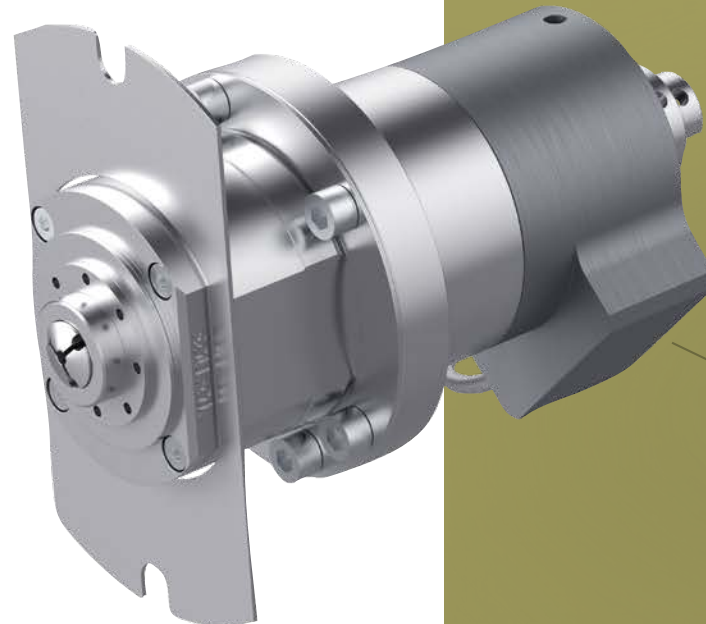
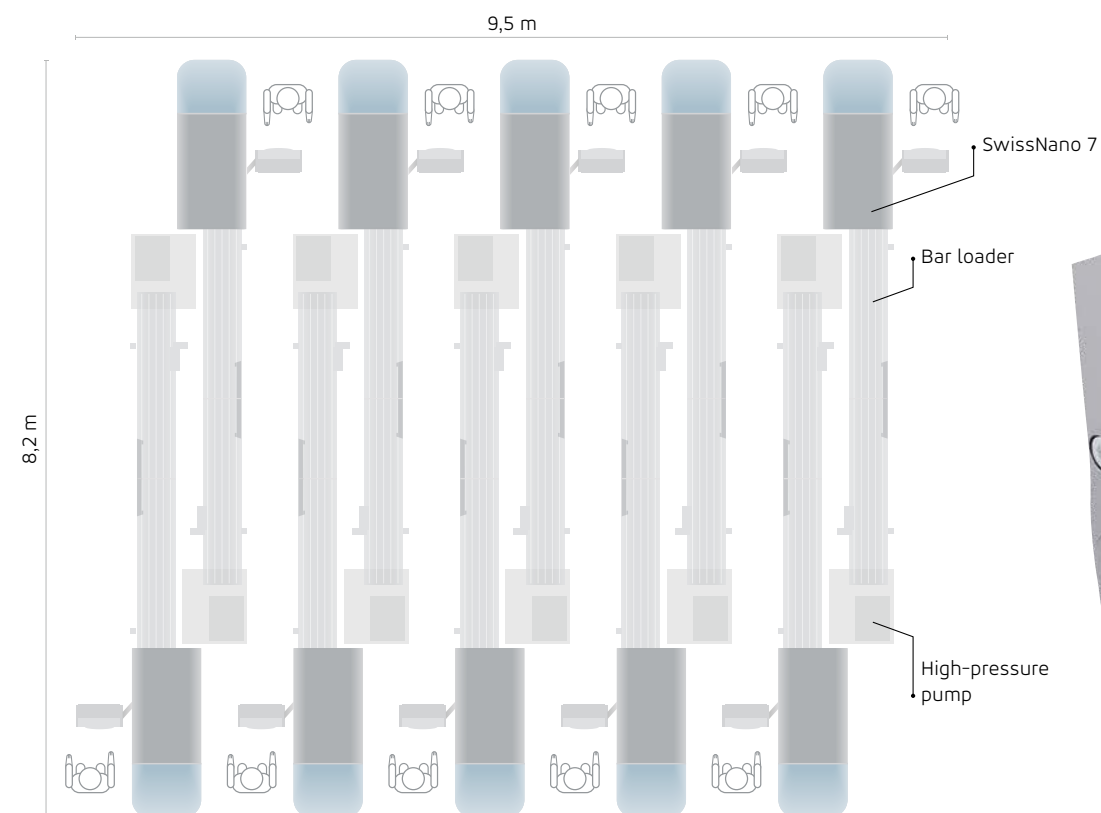
## The smallest footprint on the market

Thanks to its reduced size and intelligent design, the SwissNano range can maximize any workshop's productivity per square meter. The SwissNano 4 has a footprint of 1.2 m<sup>2</sup>, while the footprint of the SwissNano 7 is slightly larger at 1.4 m<sup>2</sup>. In addition to its compact footprint, the SwissNano range is designed to make smart and efficient use of resources. As a result, the spindles are sized accordingly.

The SwissNano 4 can easily take the place of a Tornos M7 cam machine in your workshop! Better still, you only need a width of 3.2 m to install three SwissNanos, whereas its numerical control competitors require more than 5 m. Your productivity will increase and your costs will decrease.

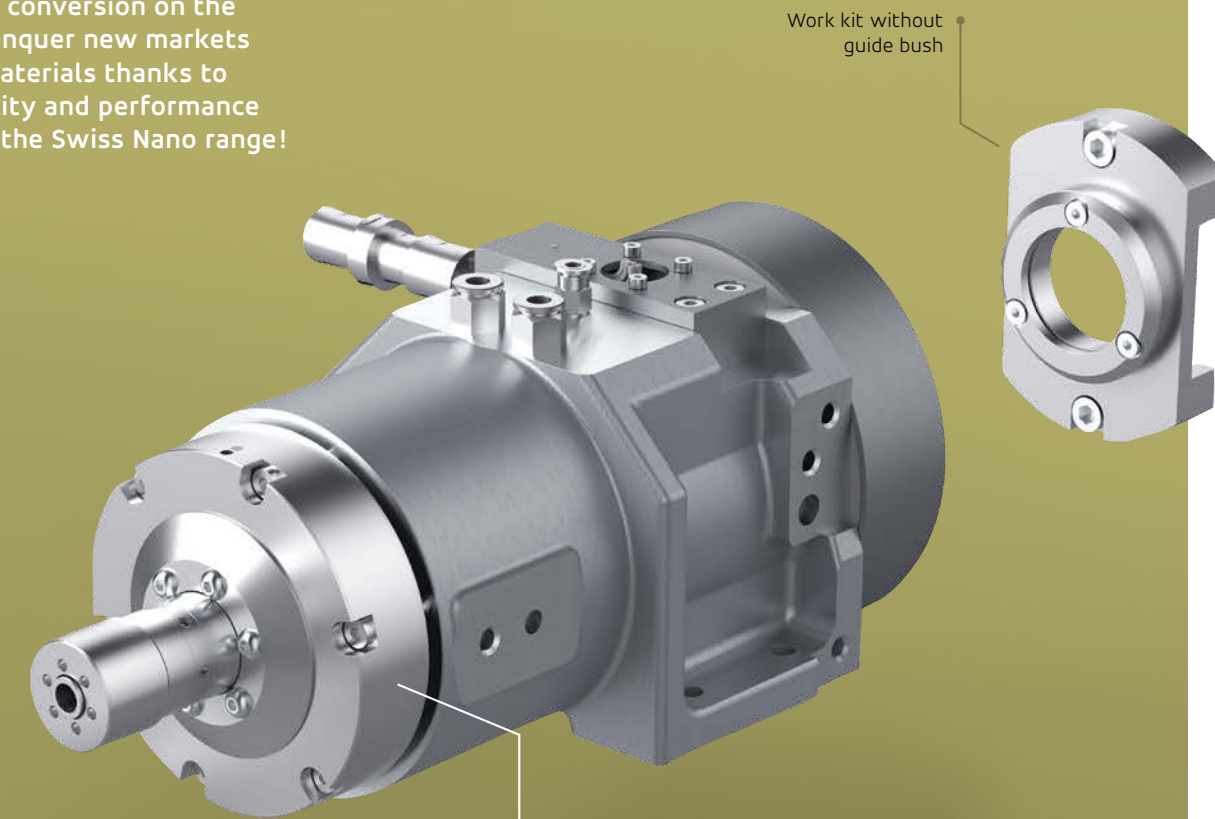
What is true for the SwissNano 4 is also true for the SwissNano 7, meaning that no fewer than 10 machines can be installed in an area measuring 10 by 8 meters.

## 10 machines in less than 80 m<sup>2</sup>



## Conversion for work with or without guide bush in 15 min

Take advantage of the quickest guide bush conversion on the market! Conquer new markets and new materials thanks to the flexibility and performance offered by the Swiss Nano range!



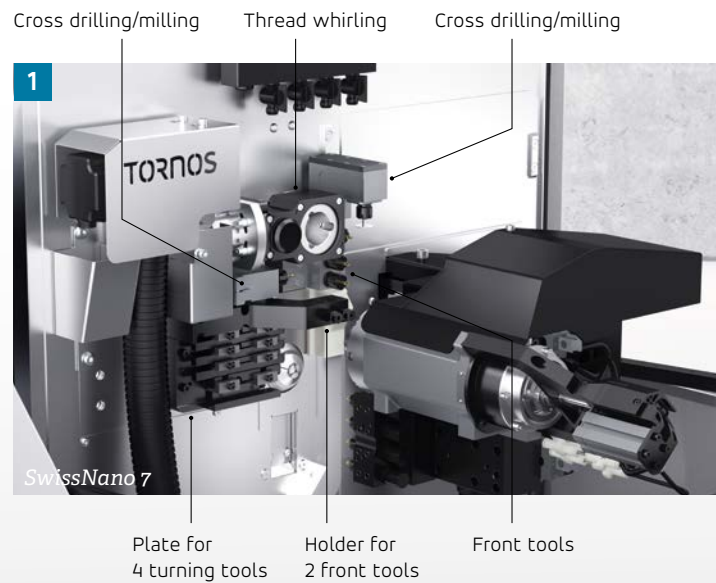
The spindles are equipped with a built-in cooling circuit. The spindles and the rotating guide bush are equipped with ceramic bearings to optimise the machine's temperature.

Motorised guide bush

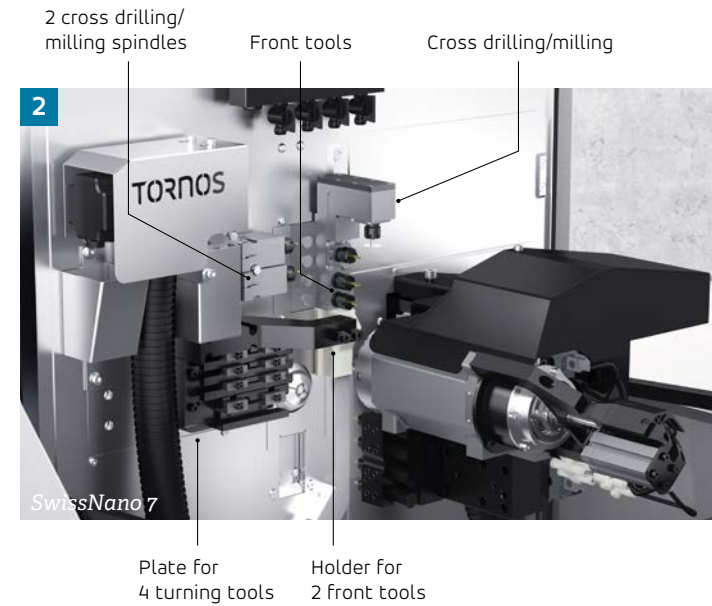
# A machine that can adapt to any requirement

## An extremely flexible machining area

There is a huge range of options available with the SwissNano 7; the machine's configuration can be adapted at any time. Compact and efficient, the machine is incredibly straightforward to set up. The most unusual part of its kinematics is undoubtedly the counter spindle which uses 3 numerical axes. This makes counter spindle centering operations much easier. This is the SwissNano concept's greatest strength!



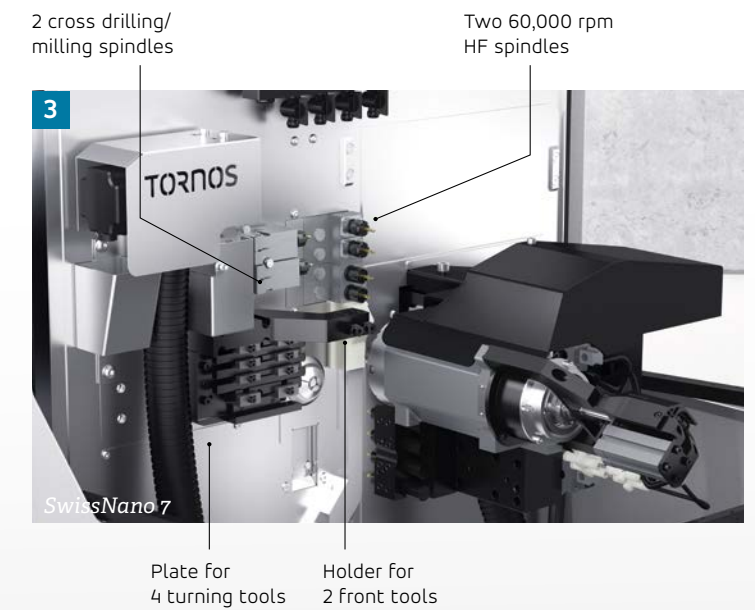
Medical



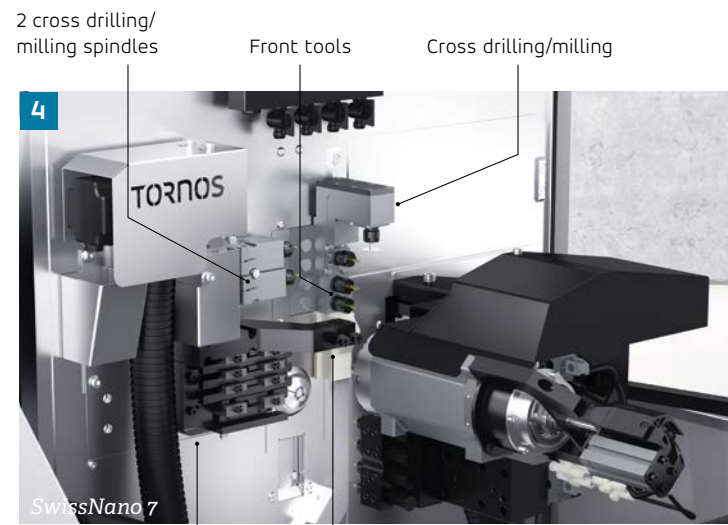
Dental 1



Dental 2



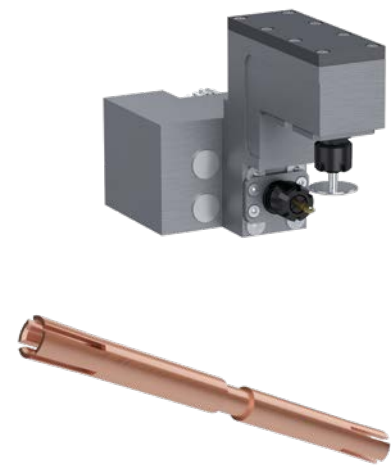




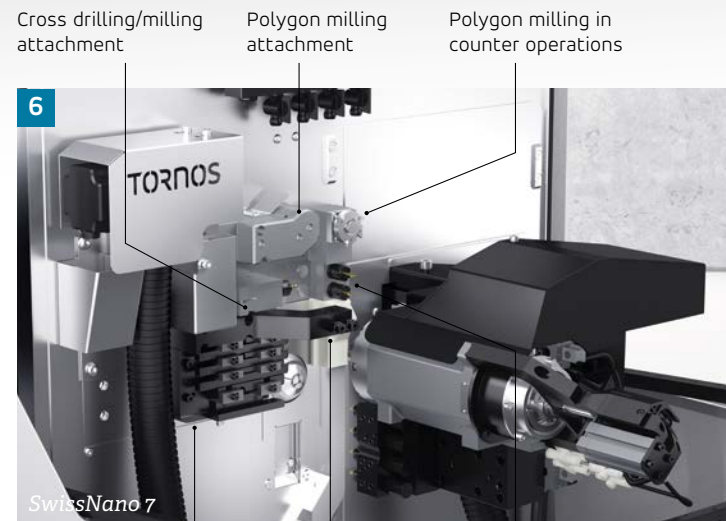
4

SwissNano 7

Plate for 4 turning tools  
Holder for 2 front tools



Electronics 1



6

SwissNano 7

Plate for 4 turning tools  
Holder for 2 front tools  
Front tools



Electronics 3



Micromechanics 1



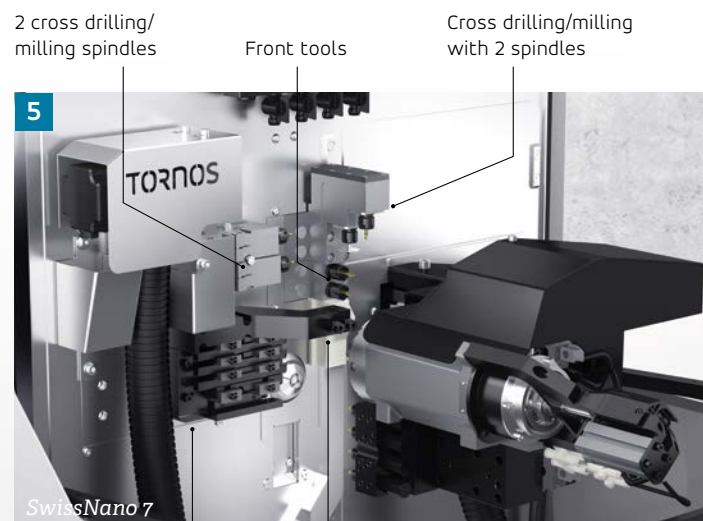
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SwissNano 7

Plate for 4 turning tools  
Holder for 2 front tools  
Front tools



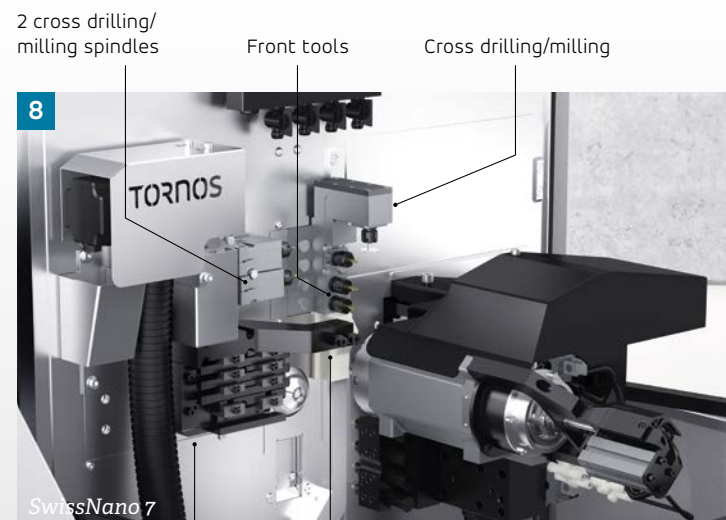
Electronics 2



5

SwissNano 7

Plate for 4 turning tools  
Holder for 2 front tools



8

SwissNano 7

Plate for 4 turning tools  
Holder for 2 front tools



Micromechanics 2



# SwissNano 4: exceptional machining performance



*Tornos engineers' custom developments allow users to improve the performance and flexibility of their machines, ensuring that they are able to meet the needs of their customers. The SwissNano has a modular machining area enabling different tool holders to be fitted according to the part requirements. The machine's tool holders were developed with the same care as the heart of the machine, in order to preserve*

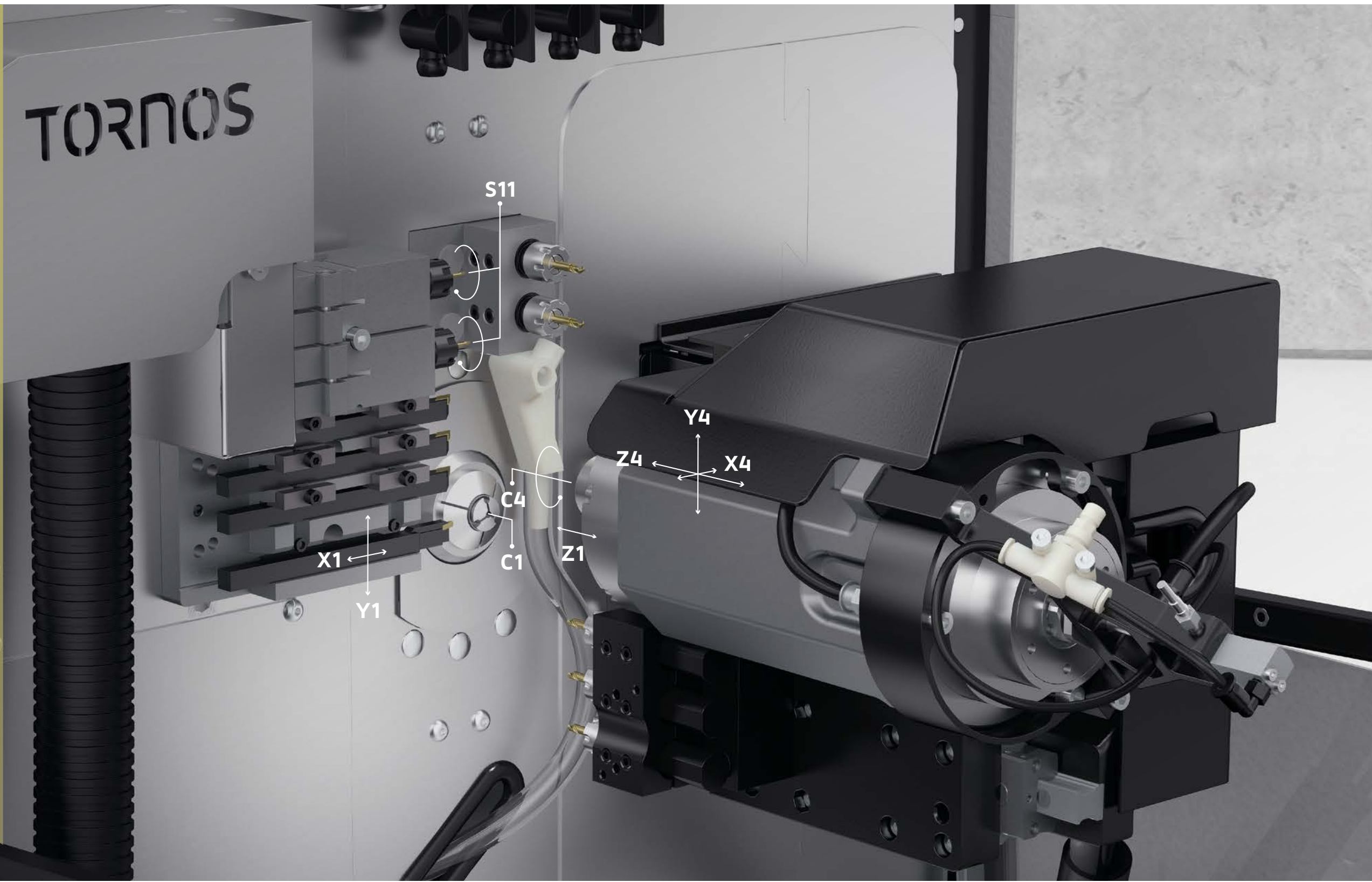
*the same level of performance, whatever the constraints may be. An example of this is the rotating tool drive motors, which cool down in order to avoid any thermal drift during machining. Like all Tornos machines, the SwissNano can be equipped with a certain number of specific options, such as a high pressure pump or high frequency spindles.*



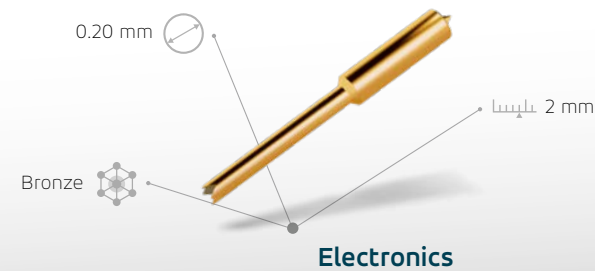
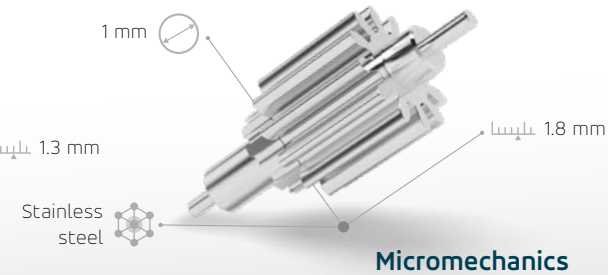
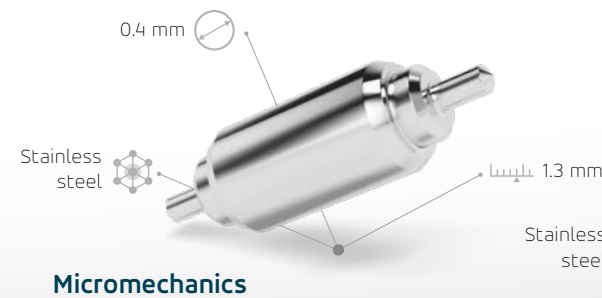
# TORNOS

## SwissNano 4 Unique machining operations

The kinematics of the SwissNano are specially designed to produce small parts with high precision requirements. The symmetrical structure of the frame provides the machine with excellent rigidity, enabling it to achieve superior finishes.



The SwissNano 4 is the ideal partner for producing parts up to 28 mm long and 4 mm in diameter.

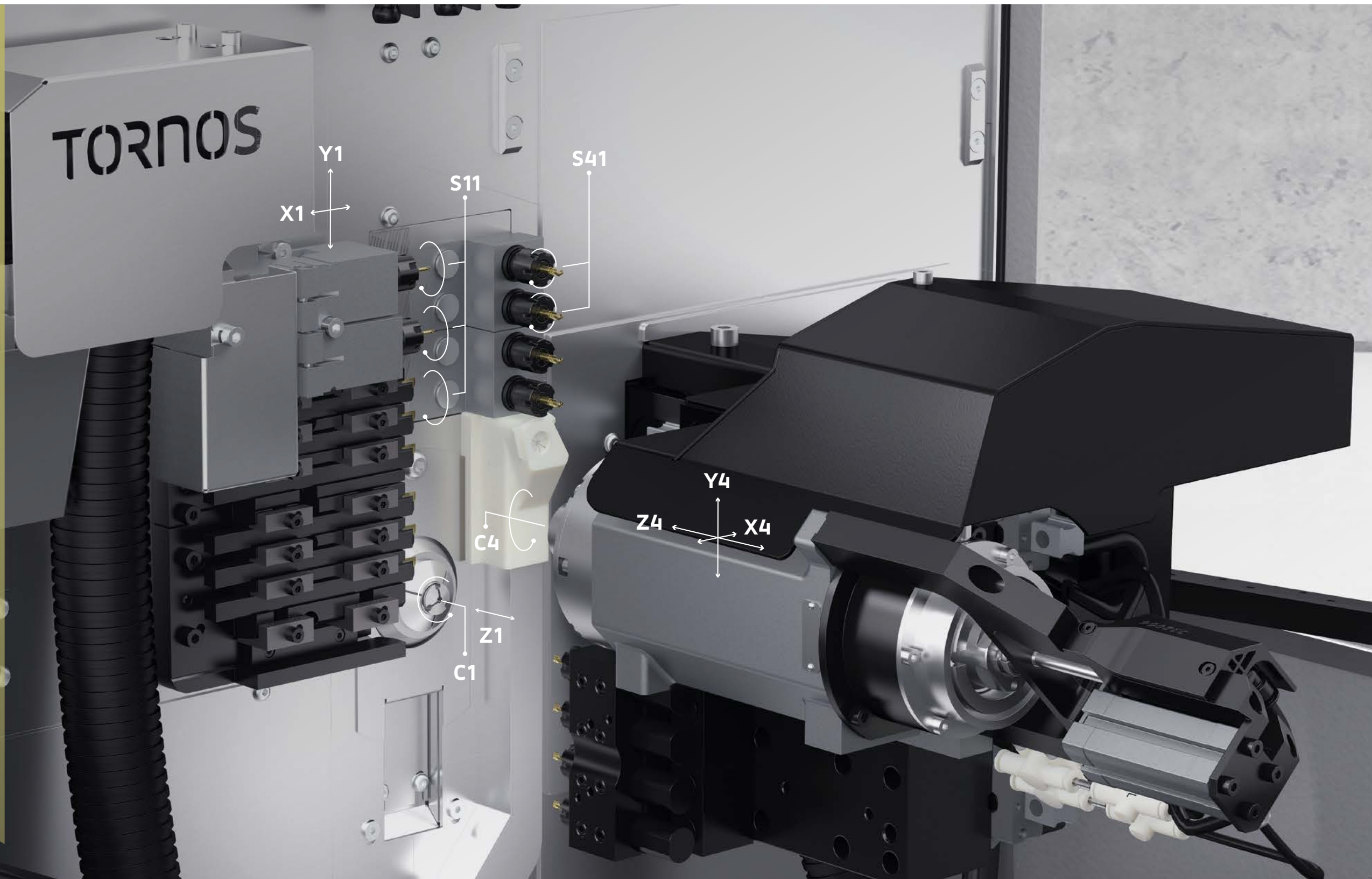




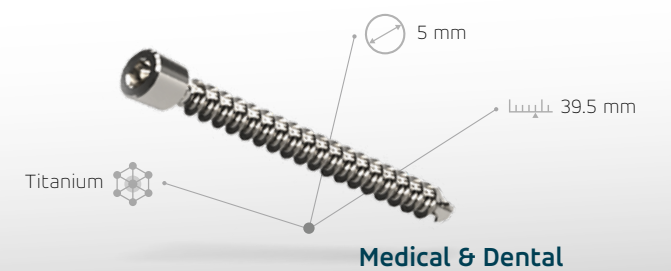
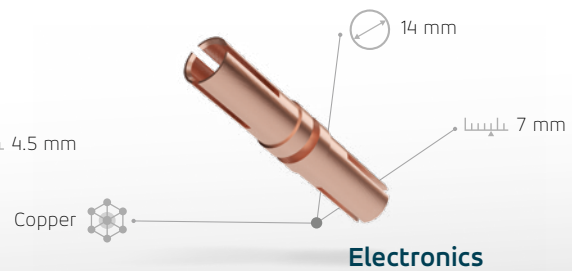
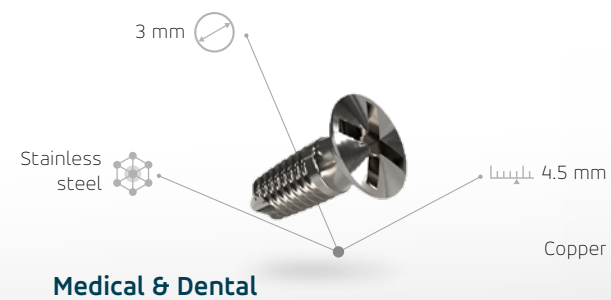
## SwissNano 7

Unique versatility

With a 7 mm bar capacity, the SwissNano 7 retains the advantages—such as the kinematics and excellent thermal stability—that made the 4 mm version so successful. The machining area has been redesigned and the available tooling expanded and optimised to enable numerous operations providing high added value.



The ideal partner for producing parts up to 50 mm long and 7 mm in diameter





# TISIS communication and programming software for your SwissNano machine



## Experience programming intelligence

In today's competitive global marketplace, there's not a moment to waste in meeting customers' demands. Our available TISIS communication and programming software puts you on the fast track to truly effortless programming and real-time process monitoring. TISIS knows your Tornos machine fleet and can help you decide which machine to use for a specific part. But that's not all: TISIS enables you to assess each machine's options, reduces the risk of collisions and the resulting downtime, and improves your production efficiency. TISIS is a smart and advanced ISO code editor that does the thinking for you. It knows your Tornos machine fleet, can help you write your code, and points out any coding errors. It puts the code in colour and can display your program in an easy-to-read Gantt diagram, making it easy for you to see the critical path and react quickly to optimise the process.

## Industry 4.0

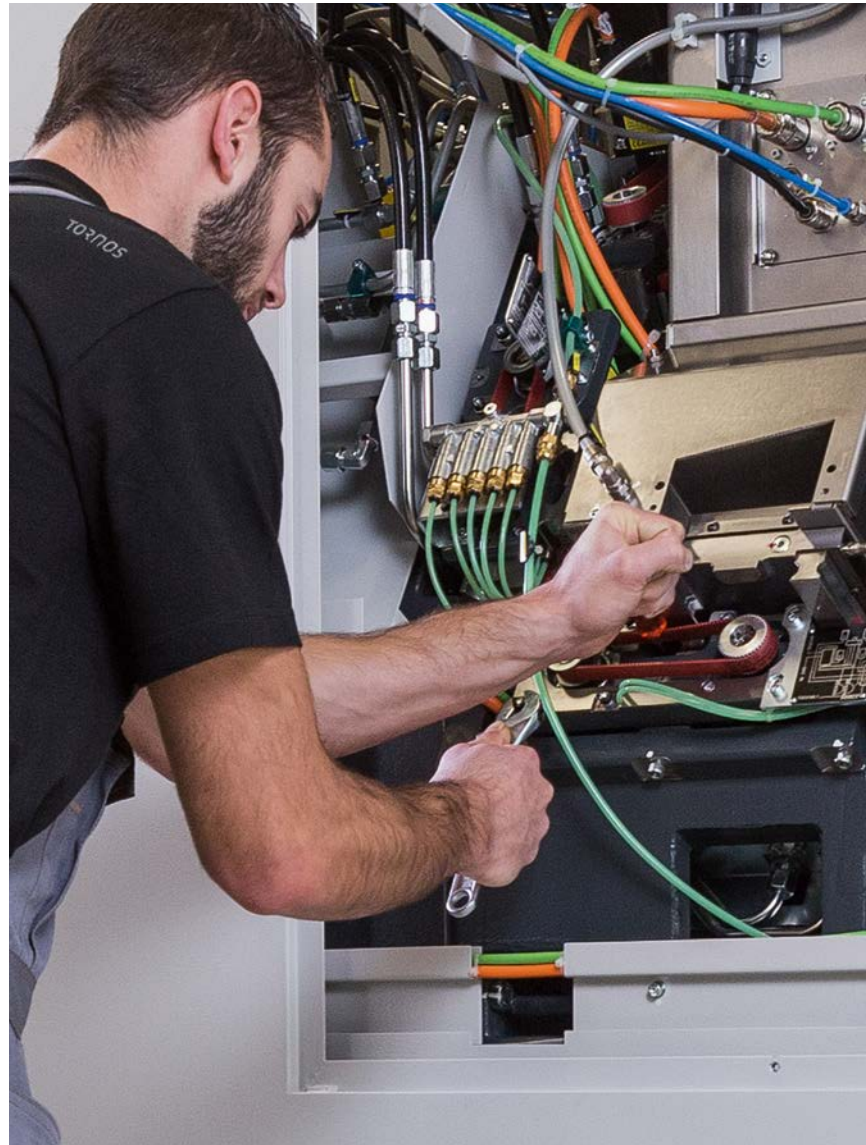
At the same time, TISIS takes the complexity out of process monitoring, enabling you to take your first steps into the Industry 4.0 universe. Even from a remote location, you can keep an eye on the details of the machining process from your smartphone or tablet. The software also enables you to quickly transfer your programs, either by USB key, or directly onto the machine via your company network. Your parts designs in various stages of completion can be stored with your program. These can then be easily found in the database using a search function.



Discover the TISIS video



# Tornos Service



Buying a Tornos machine is much more than a business transaction. It is your investment in the future. Tornos Service thrives worldwide by guaranteeing the superior production capabilities of products carrying the Tornos name.

Situated close to its customers, as demonstrated by the 14 Tornos Service Centres strategically located across Europe, Asia, and the Americas, Tornos Service offers a comprehensive range of leading support services for Tornos machines, and encompasses the innovation, reliability and attention to detail expected of a premier Swiss brand. And it is all backed by a 100-year legacy of expertise and in-depth understanding of customers' processes, applications and challenges across a wide range of industrial segments, including automotive, medical, electronics and connectivity, and micromechanics.

### Start-up assistance

From the first feasibility tests prior to purchase, you are in good hands with Tornos Service. In our state-of-the-art Customer Centers, expert application engineers support you with tests to gauge the feasibility of machining processes and applications. With start-up assistance, you are secure in the knowledge that you will never be left alone to deal with a brand new machine.

### Expert training and coaching

Engineered for intuitive and easy use, Tornos machines offer a vast range of options and enable myriad processes. Expert training and coaching help your employees become specialists proficient in programming, handling and maintenance, adding more value to your processes, applications and products.

### Free Hotline support

Wherever you are in the world, highly qualified specialists who speak your language and understand your processes are just a phone call away to quickly support you with handling and programming solutions.

### On-site support

Fast, efficient on-site operations and preventive maintenance ensure the continuous high performance of your Tornos machines. Regular

scheduled preventive maintenance can help you avoid 70% of machine breakdowns and keep you on the path to productivity.

### Certified original spare parts

Rapid, reliable, worldwide delivery of certified original spare parts is a speciality of Tornos Service. Regardless of the age of your Tornos machine, we stock the essential certified spare parts to keep the machine running at peak performance.

### Machine overhauls

Tornos machines inspire confidence. It's no surprise, therefore, that many customers turn to Tornos for a complete overhaul of their machines. The Tornos overhaul service returns the machines in good-as-new condition, significantly extending their service life.

### Options, upgrades and X-change modules

To help you achieve your manufacturing, productivity and quality objectives, our experts collaborate with you to manage complex machining processes, develop software features for machining complex shapes, design special equipment, and tailor peripherals to your needs. Tornos' X-change modules expand your application capabilities and profitability.

Backed by both geographical proximity to customers and an in-depth understanding of their processes, applications and market challenges, Tornos Service delivers an unparalleled continuum of support: start-up assistance, expert training and coaching, free hotline, on-site operations support and preventive maintenance, original spare parts seamlessly delivered worldwide, complete overhauls to extend the service life of Tornos machines, and a range of operations and X-change modules to expand customers' application capabilities and profitability.



Discover  
Tornos Service



# Technical specifications



## TECHNICAL SPECIFICATIONS

	SwissNano 4/6	SwissNano 7/6
<b>Main spindle (Z1/ S1/ C1)</b>		
Max. bar capacity mm 4	mm 4	7
Standard workpiece length with fixed guide bush and synchronous rotating guide bush	mm 28	50
Spindle rotation speed	rpm 16,000	15,000
Spindle power (nominal S1/S6)	kW 1.3/1.5	1.9/2.9
Torque (nominal S1/S6)	Nm 0.8/1.0	1.9/2.8
<b>Guide bush holder (X1/ Y1/ S11)</b>		
Number of tool positions on guide bush	7 (8)	7+3
Turning tool section	8x8 (7x7)	8x8
Positions for radial rotating tools	(option) 2	(option) 3
Rotating tool speed of rotation	rpm 8,000	10,000
Rotating tool power	kW 0,5	0,5
Steel drilling/rotating tool capacity	Ø 2.5, f=0.15 mm/t	Ø 6, f=0.2 mm/t
Rotating tool/steel tapping capacity	M3x5	M5x15; M6x5
<b>End attachment and counter spindle (X4 / Y4 / Z4 / S4)</b>		
Number of tool positions	3 x Ø 16	4 x Ø 16
Max. bar capacity	mm 4	7
Insertion length of workpiece into counter spindle	mm 26	40
Counter spindle rotation speed	rpm 0-16,000	0-16,000
Counter spindle power (nominal S1/S6)	kW 1.3/1.5	1.3/1.5
Torque (nominal S1/S6)	Nm 0.8/1.0	0.8/1.0
Counter spindle ejector stroke	mm 25	40
Steel drilling/rotating tool capacity	Ø 2.5, f=0.15 mm/t	Ø 2.5, f=0.15 mm/t
Rotating tool/steel tapping capacity	M3x5	M3x5
<b>Technology</b>		
Working without a guide bush		YES
Synchronous motorised guide bush		YES
2 C axes		YES
Primary and secondary polygon operations		YES
Primary and secondary cutting operations		YES
3-axis counter spindle		YES
Cutting and deburring		YES
Z4 turning/drilling		YES
Roughing		YES

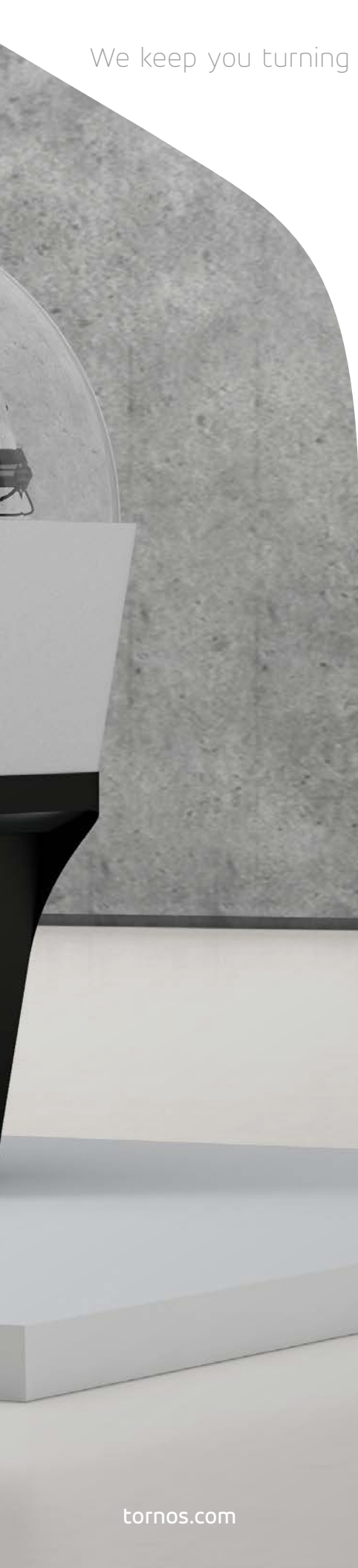
## TECHNICAL SPECIFICATIONS

	SwissNano 4/6	SwissNano 7/6
<b>Counter operation</b>		
Number of tool positions	2 x Ø 16	4 x Ø 16
Positions for rotating tools	2	2
<b>Total number of tools</b>		
Total number of basic machine tools	12 (13)	18
<b>Basic machine equipment</b>		
Basic machine equipment	●	●
Fixed guide bush + oil filter	●	●
Front platten rotating tool motor	●	●
C1 axis	●	—
C1 + C2 axis	—	●
Polygon operation (and gear hobbing) function programming	○	○
Thread milling device	○	○
Gear hobbing device	○	○
Radial drills	●	●
Adjustment of S4 counter spindle end of clamping	●	●
Pneumatic ejection of workpiece + air/oil cleaning of collet	●	●
Automatic centralised lubrication cycle	●	●
Beacon (1 colour)	●	●
Fire extinguisher interface	●	●
CNC type	Fanuc Oi TD	Fanuc Oi TF
<b>General specifications</b>		
Max. length	mm 1,800	1,855
Length with LNS Tryton 3 m	mm 5,900	5,955
Max. width	mm 650	750
Height (without signalling lamp)	mm 1,575	1,655
Spindle height	mm 1,150	1,150
Weight	kg 750	900
Cutting oil tray capacity	l 45	70
Coolant pump power	kW 0.18	0.18
Colours: RAL 9006 grey, RAL 9011 graphite black		
CE/CEM certified		

● Standard ○ Optional — Not available



We keep you turning



[tornos.com](http://tornos.com)

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Tornos  
throughout  
the world



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