

TORNOS



*The micro and nano
precision specialist*

SwissNano

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SwissNano

The SwissNano was designed to meet the demand for small workpieces requiring very high precision. The kinematics of the machine enable it to produce the majority of turned parts of a watch movement measuring up to 4 mm; from the simplest to the most complex pieces, including cutting, with excellent finishes. Its capability extends beyond horological applications to include any type of workpiece requiring extreme quality and precision.



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

Small is beautiful

High precision

The SwissNano brings out unique emotions with its innovative design. Another layer is added to this small, ultra-high performing machine with the possibility 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 excellent finishes and extends the cutting 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 requirements of the workpiece.

Performance

- Possibility of carrying out high value-added operations, for example gear hobbing, polygon milling, thread milling and internal thread-whirling.
- 2 positions for rotating tools, optional high-frequency spindle also available.
- Various workpiece recovery systems enable fragile and/or small workpieces 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 machine area of 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: Adjustment and tool centering for tools mounted under the counter spindle, centering of the counter spindle at the guide bush and even tools in counter-operations is extremely easy for the operator.

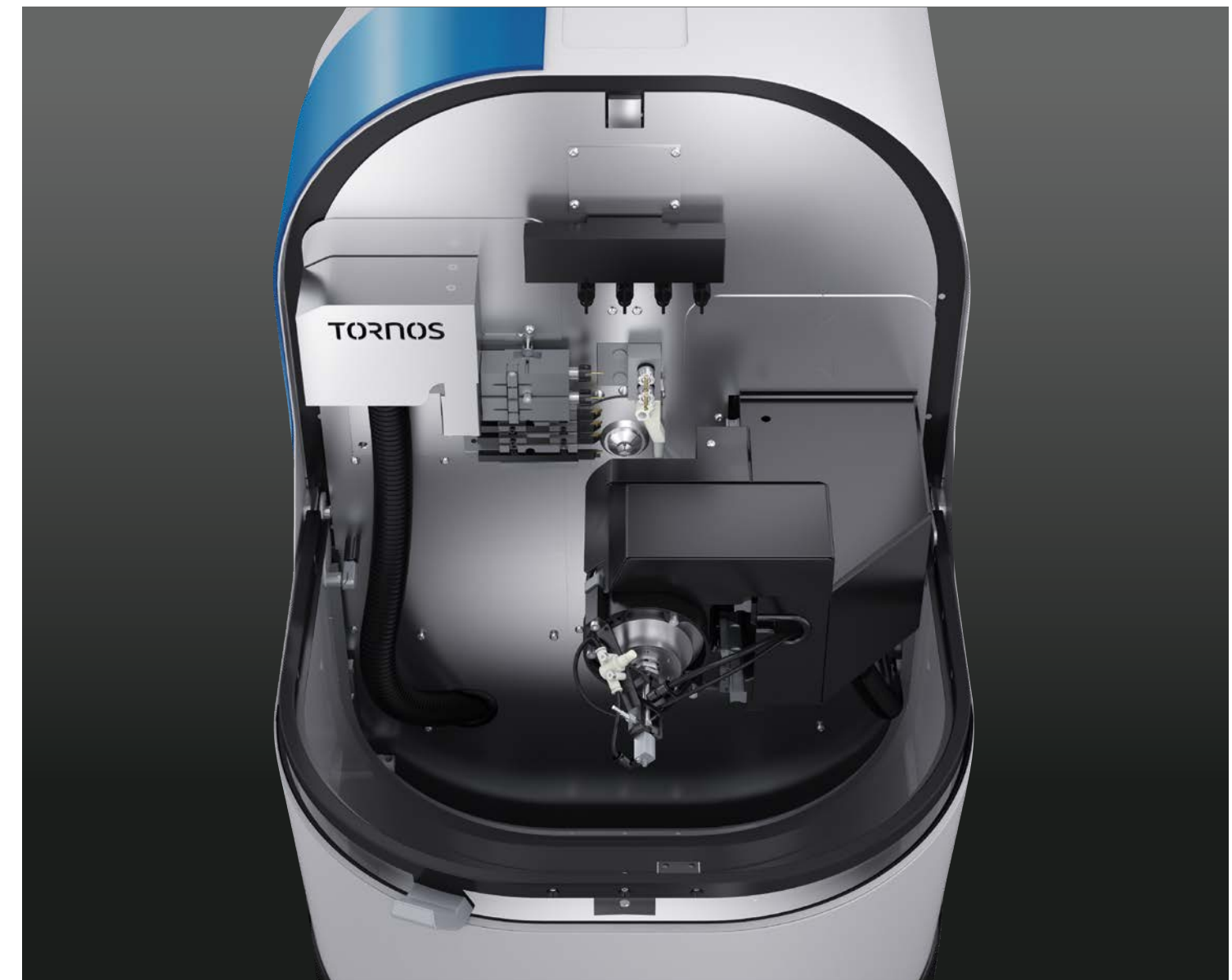
The SwissNano's unique design offers perfect access to the tools and allows the operator

to position themselves 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. The SwissNano's energy consumption is significantly lower than that of its direct competitors.



Foolproof repeatability and precision

16,000 rpm

Reliable, precise, and ergonomic, the SwissNano enables you to respond to the most demanding machining precision 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 repeatability requirements whilst guaranteeing high quality finishes and allowing the user to remain competitive in 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 warms up extremely quickly, and after a change of setup it does not need to be preheated, the first part comes out perfectly, the repeatability is very high and the precision of the machine is consistent throughout production.

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

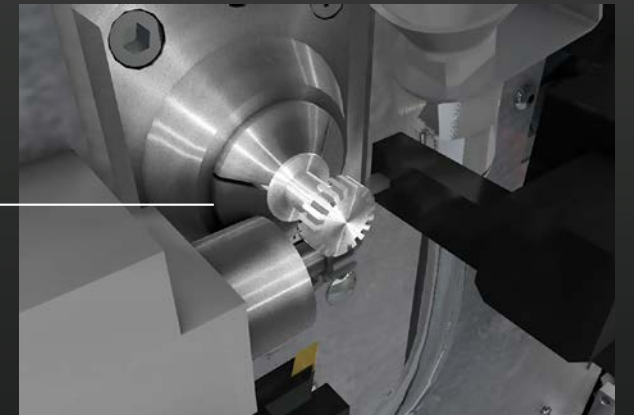
The SwissNano is the only machine in the market able to make such a simple conversion; by switching from working with a guide bush to working with a collet in a matter of minutes. The machine is simple to use: Its TMI interface fully automates switching between fixed and rotating guide bushes or no guide bush at all. Simply select your preferred setup on the interface and the machine automatically makes all the settings for the operator. This option further reinforces the machine's flexibility and truly makes it the perfect partner for machining small components that require extreme precision.

Small footprint of 0.7 m²

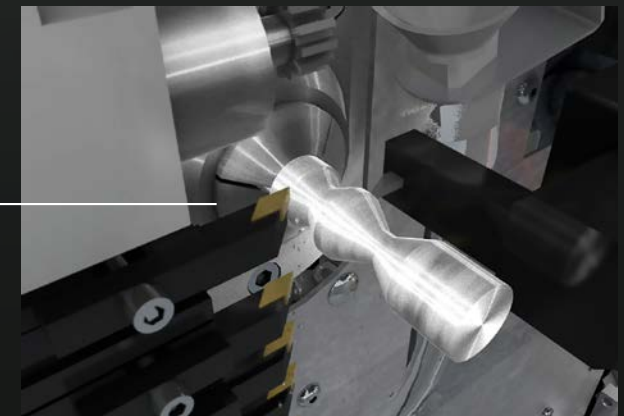
Unique machining operations

The kinematics of the SwissNano have been specifically developed to produce small workpieces with high precision requirements. The symmetrical cast iron structure provides the machine with excellent rigidity and the ability to achieve superior finishes.

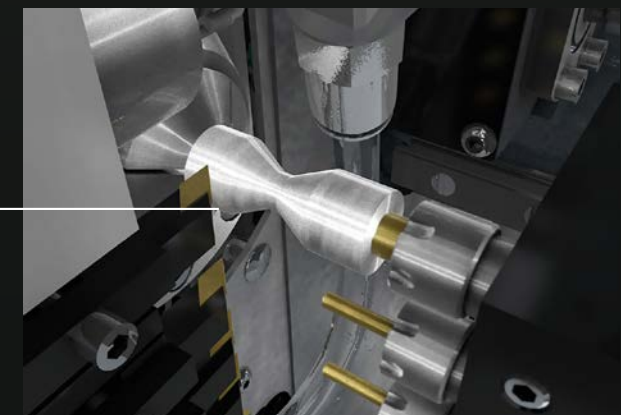
Cutting and deburring



Rough finishing



Turning and drilling



The possibilities are endless

Thread milling device

Occasionally used as a polygon milling 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 workpiece being machined up close.



Screw video



Vacuum

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

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.



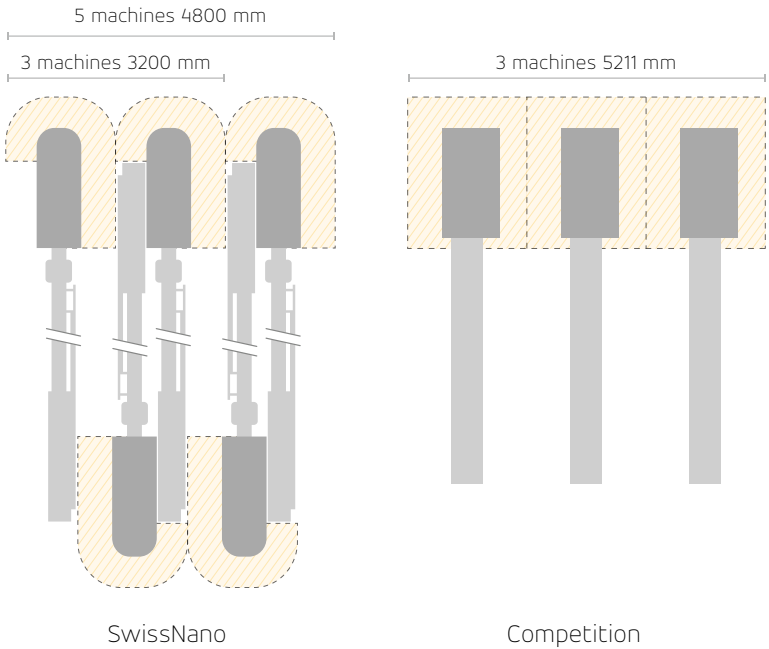
Cannon pinion video



Pinion of second video

The smallest footprint in the market

Thanks to its reduced size and intelligent design, the SwissNano 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 reduce.



High-frequency spindle

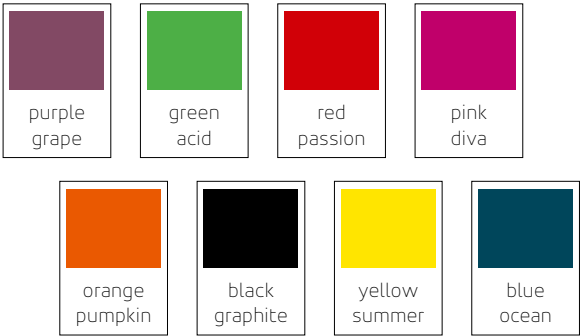
As a special adaptation, the SwissNano can be equipped with high-frequency spindles, in main operation or counter-operation, as required by the workpiece. The machining of a illustrated dual tray with two front-mounted spindles, is one of the most difficult parts to produce on a bar turning machine and, as you will see in the video, the SwissNano does a marvellous 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.



Dual tray video

Customisation

Unique machine, unique design and unique customisation options. Your SwissNano is customised according to your requirements and wishes, choose from amongst our range of colours or contact us to create a unique model.



Exceptional machining performance



The custom developments made by Tornos engineers 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 requirements of the workpiece. The machine's tool holders have been developed with the same care as the heart of the machine, in order

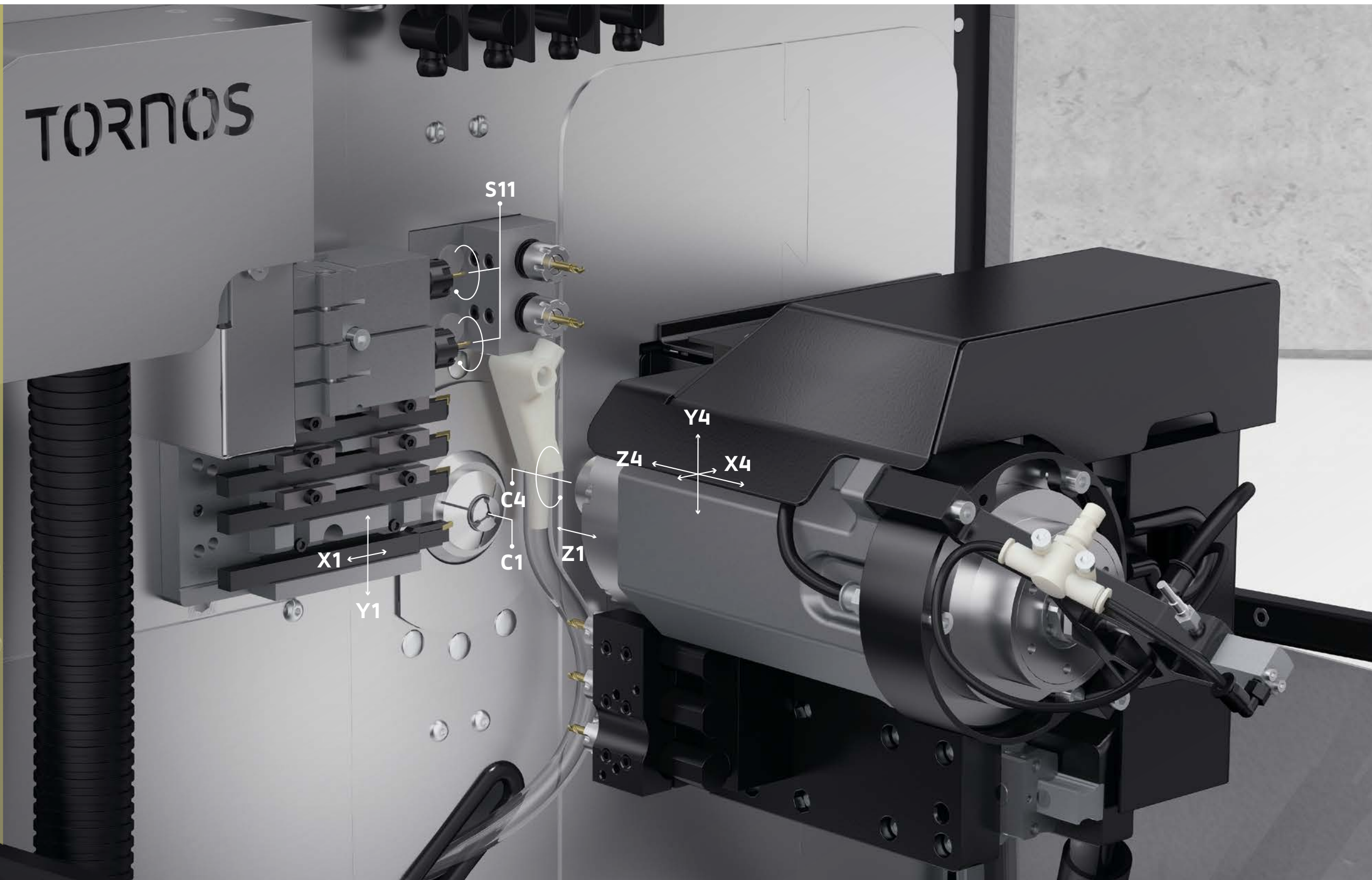
to preserve the same level of performance, whatever the constraints may be. An example of this is the rotating tool drive motors, which stay cool in order to avoid any thermal drift during machining.

The SwissNano, like all Tornos machines, can be equipped with a certain number of specific options, for example, a high pressure coolant pump or high-frequency spindles.

SwissNano

Unique machining operations

The kinematics of the SwissNano have been specifically developed to produce small work-pieces with high precision requirements. The symmetrical structure of the frame provides the machine with excellent rigidity and the ability to achieve excellent finishes.



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

0.4 mm
1.3 mm
Stainless steel
Micromechanics

1 mm
1.8 mm
Stainless steel
Micromechanics

0.20 mm
2 mm
Bronze
Electronics

2.5 mm
9.5 mm
Stainless steel
Automotive



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 stoppages, 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. As an option it is also possible to use our smart TISIS CAM solution, designed to help you master your Tornos machine when it comes to complex and very complex parts. TISIS CAM significantly reduces setup time and, coupled with TISIS, it is the perfect solution for efficiently programming and optimising parts.

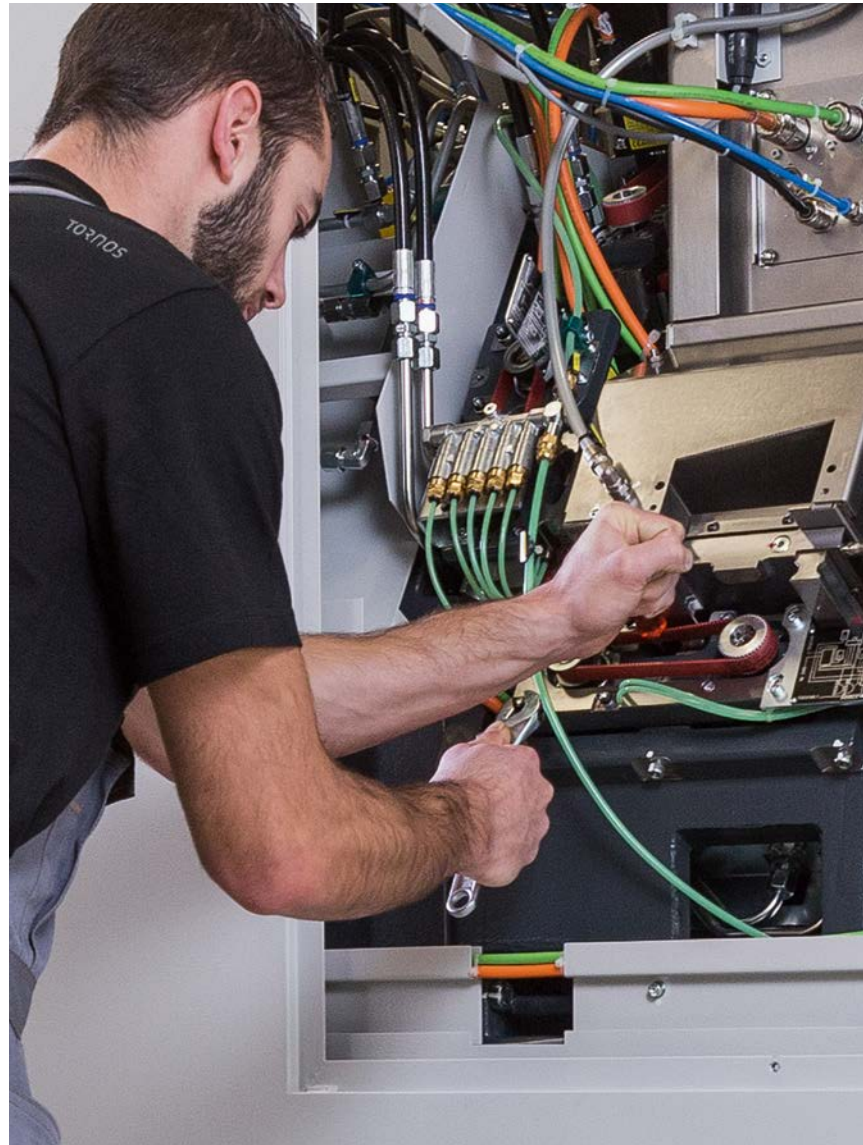
Industry 4.0

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



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.

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 12 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 Techno Centres, 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 the your Tornos machine, we stock the essential certified spare parts to keep the machine running at peak performance.

Machine overhauls

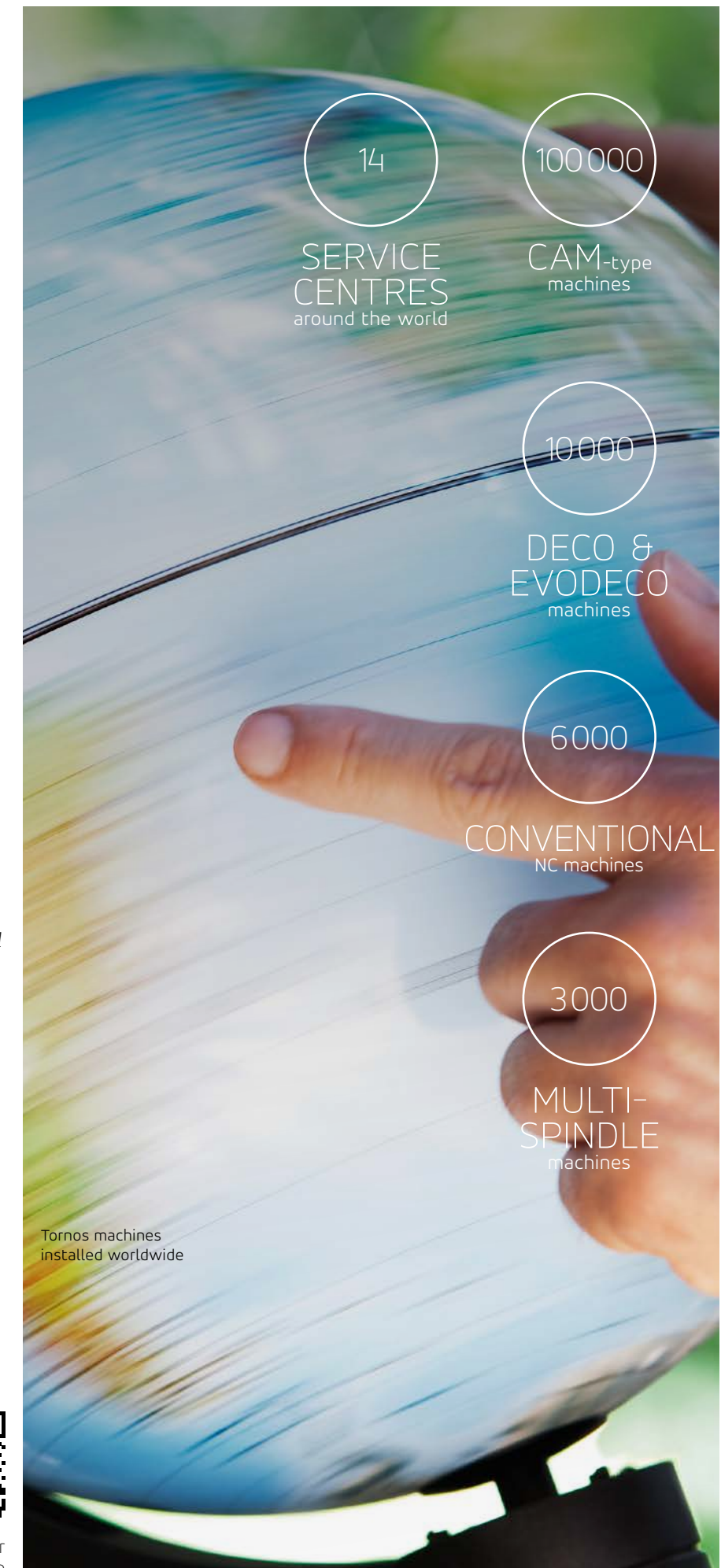
Tornos machines inspire confidence. It's no surprise, therefore, that many customers turn to Tornos for a complete overhaul of their machines. The Tornos overhaul service returns the machines in good-as-new condition, significantly extending their service life.

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.



Discover
Tornos Service



Technical specifications



TECHNICAL SPECIFICATIONS

SwissNano 4/6

Main spindle (Z1/S1/C1)		
Max. bar capacity	mm	4
Standard workpiece length with fixed guide bush and synchronous rotating guide bush	mm	28
Spindle rotation speed	rpm	0-16000
Spindle power (nominal/max)	kW	1.3/1.5
Torque (nominal/max)	Nm	0.8/1.0

Guide bush holder (X1/Y1/S11)		
Number of tool positions on guide bush		7 (8)
Turning tool section		8x8 (7x7)
Positions for radial rotating tools (option)		2
Rotating tool speed of rotation	rpm	8000
Rotating tool power	kW	0.5

End attachment and counter spindle (X4/Y4/Z4/S4)		
Number of tool positions		3x Ø 16
Positions for rotating tools		2
Max. bar capacity	mm	4
Insertion length of workpiece into counter spindle	mm	26
Spindle rotation speed	rpm	0-16000
Spindle power (nominal/max)	kW	1.3/1.5
Torque (nominal/max)	Nm	0.8/1.0
Counter spindle ejector stroke	mm	25

TECHNICAL SPECIFICATIONS

SwissNano 4/6

Counter operation	
Number of tool positions	2x Ø 16
Total number of basic machine tools	12 (13)
Positions for rotating tools	2

Basic machine equipment	
Fixed guide bush + oil filter	●
Front platten rotating tool motor	●
C1 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	●

General specifications		
Max. length	mm	1800
Length with LNS Tryton 3 m	mm	5900
Max. width	mm	650
Height (without signalling lamp)	mm	1575
Spindle height	mm	1150
Weight	kg	700
Cutting oil tray capacity	l	45
Coolant pump power	kW	0.18
Colours: RAL 9006 grey, RAL 9011 graphite black		
CE/CEM certified		

● Standard ○ Optional — Not available

We keep you turning

tornos.com

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Tornos
throughout
the world



Complies with current European CE/EMC Safety Directives.

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