

The image shows a large industrial 4-axis machining center, model TK 427N. The machine is primarily grey and orange. It features a long, horizontal bed with a sliding table. A complex tool head assembly is mounted on the table, capable of moving in four axes. A control console with a monitor and buttons is positioned at the front left. A yellow safety fence surrounds the machine. The background is white with three orange lines extending from the top left towards the machine.

TK 427N

4 Axis machining centres

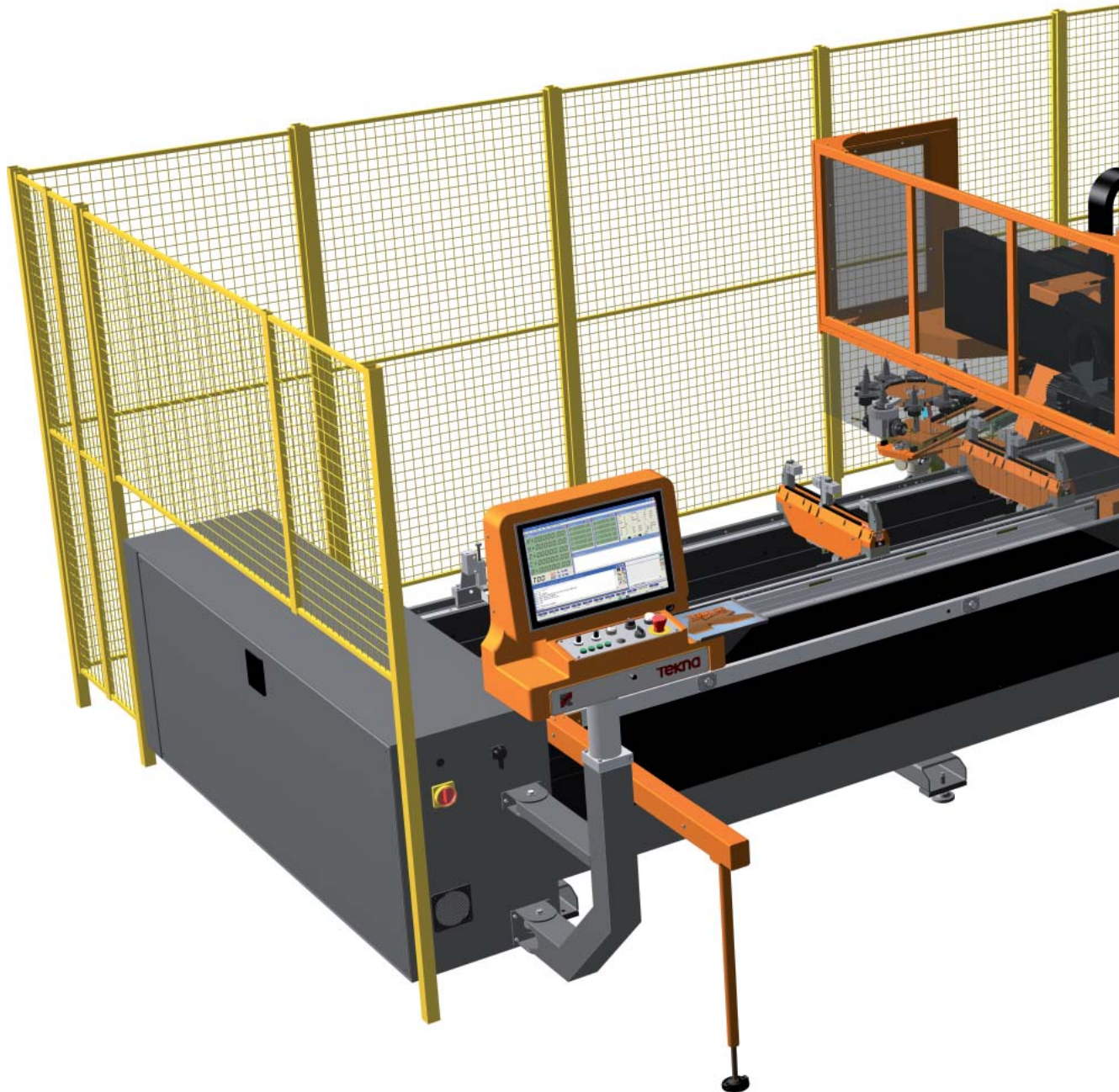
TK 427N

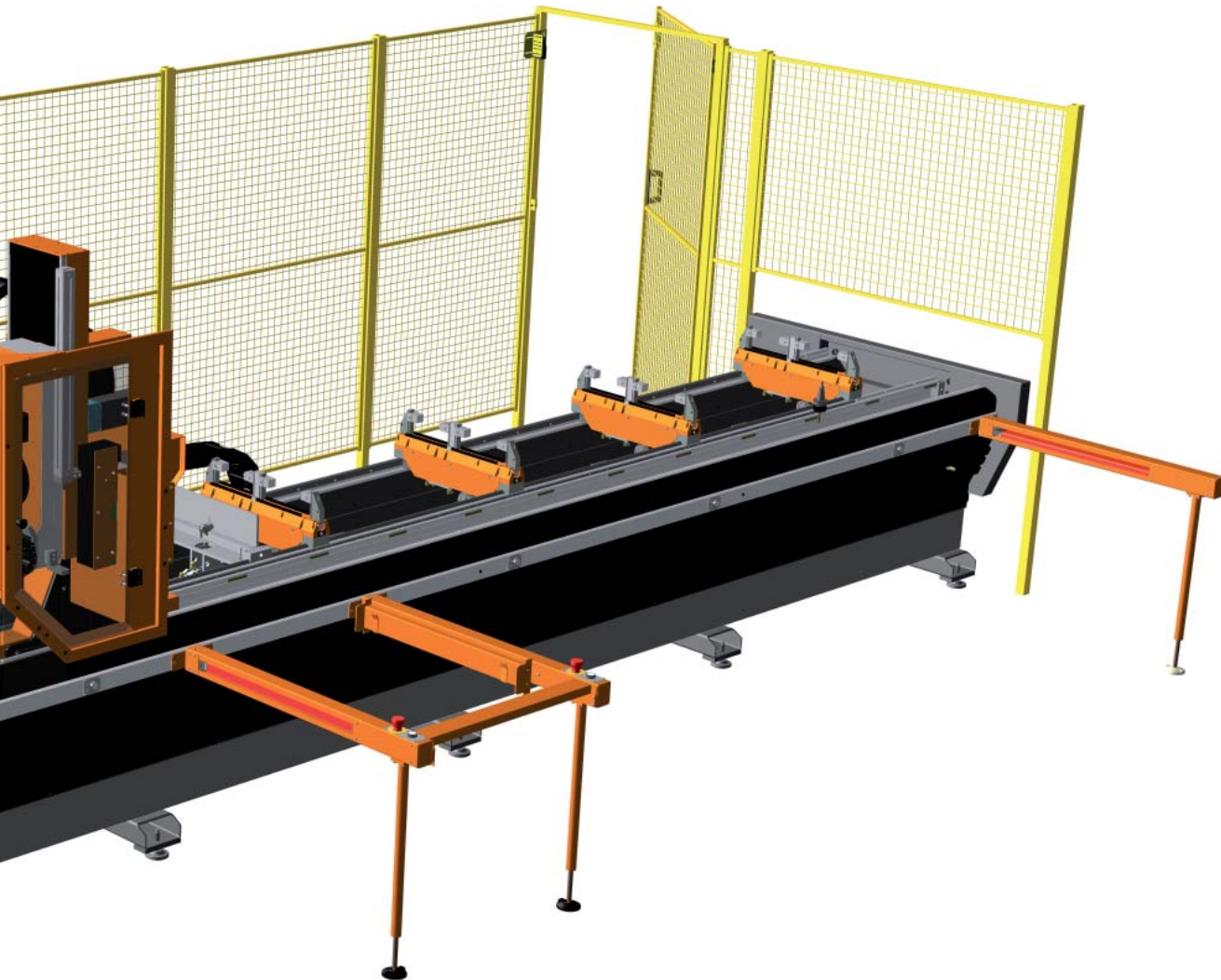
4-axis CNC vertical machining center equipped with an electric spindle that can rotate around the C axis, this allows for machining on three sides of a profile with just one clamping operation.

The TK 427N model is a 4-axis machining center with limited dimensions whose performances allow the use of this machine in the window/door frame industry as well as in the manufacturing industry.

This machining center is designed for drilling and conventional milling processes and also for copy-milling operations on aluminum extruded profiles and other materials, including steel profiles up to 5 mm thick, steel reinforced PVC, and various other plastics or wood.

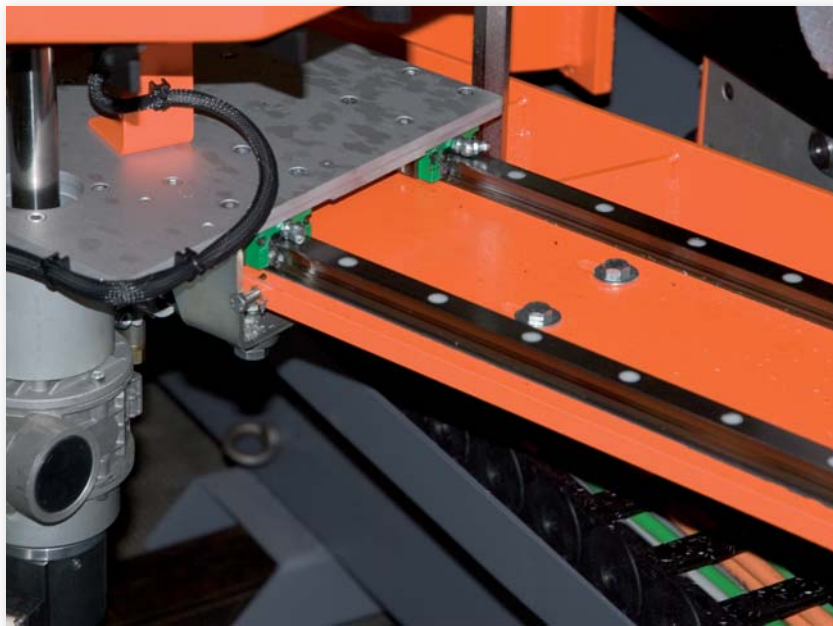
Standard versions are available in 3 machining lengths: 3200, 6200 and 7700 mm. Upon request the machining center can be manufactured in different lengths in order to meet the special needs of each customer.





Features

- Electrically welded steel bed frame with linear recirculating ball slideways and precision racks for X axis.
- Overhead crane in aluminum casting composed of two lateral supporting elements and a top crosspiece. This crosspiece holds the linear slide-ways with recirculating balls of Y and Z axis as well as the precision rack (Z axis) and the recirculating ball screw (Y axis).
- Machines 6200 or 7700 mm long are divided into two work areas. While the unit is machining on one side, the operator can safely load/unload the second work area.
- System which allows for the automatic positioning of each clamp according to the profile length and the machining process to be performed. The positioning is performed using the carriage and it is driven by the CNC control system.
- Electric-spindle which is equipped with an automatic tool change system with an electric cooling fan.



■ **Linear slideways with recirculating balls**

Thanks to these slide-ways, machine's components can smoothly slide along the machining axis. The ability to withstand mechanical stress while simultaneously maintaining a low coefficient of friction and a high sliding capacity enables these linear slide-ways to improve the performance of the machining center.



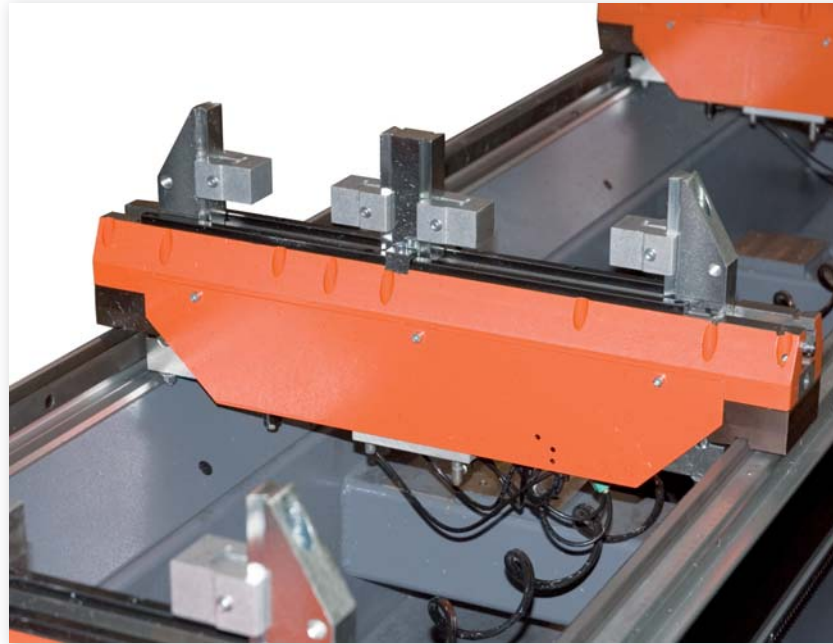
■ Tilting electric-spindle

The rotation is powered by a brushless engine. The precision reducer that is provided allows for angle adjustments between $+90^\circ$ and -90° along the horizontal axis, with increments of 0.01° .



■ **Micro dropped minimal lubrication**

It optimizes the cooling liquid consumption during the machining; this system allows to minimize the quantity of the used product and meanwhile it guarantees a suitable cooling of the tool.



■ Pneumatic one/two-way clamps

Pneumatic clamping system that are automatically positioned by the milling head; the clamp arrangement is controlled by the CNC system. Using the two-way system you can simultaneously machine 2 profiles with different dimensions and machining processes.



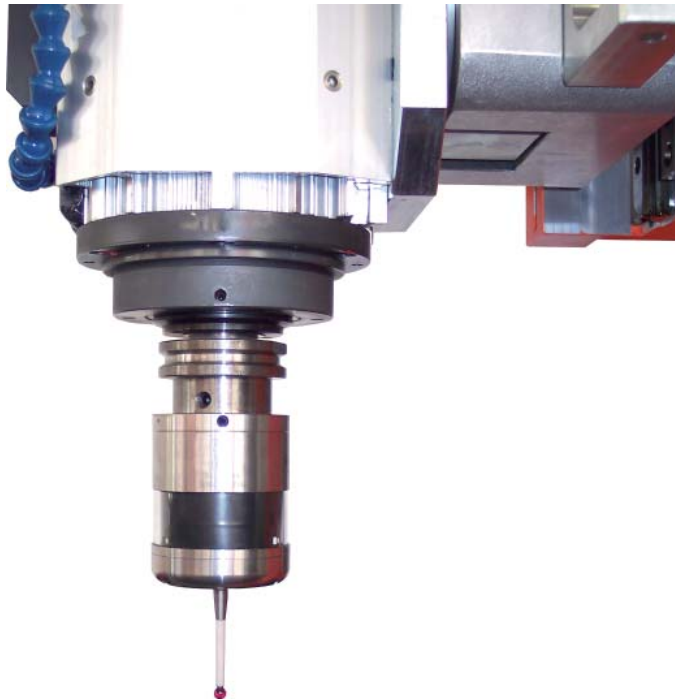
■ Revolver type tool magazine

Automatic revolver tool magazine that can hold 9 tools plus 1 aggregate head and is equipped with a removable cover that protects against chips and dust formed during machining.

This head-mounted tool magazine can easily be accessed, thus reducing tool change time.

Optional

- Aggregate heads.
- Motor-driven conveyor belt.
- Auxiliary container for cooling liquid (30 liter).
- Laser detection kit.
- 3D Probe.
- Barcode reader.
- Remote controlled electronic wheel.
- Uninterruptible power supply (UPS).



■ 3D Probe

Contact probe that is used to accurately inspect the workpieces with complex geometric forms. This device improves the productivity thanks to the fast and accurate measurement of the components.

Special machines/Customization

Tekna has always been ready to find solutions that could meet customers' different manufacturing needs. For this reason, different versions of the TK 427N model have been manufactured. Each version is customized with special systems that can be used to perform machining processes other than those the machine was originally designed for. Following are some production examples that Tekna has developed to meet its customer demand.



- Machining center that can be alternatively equipped with a standard clamping system or with a clamping system made up of vacuum tables that allow composite panels and plates to be held by vacuum.

Technical features

Machinability	
Axis X	3200 mm 6200 mm (Twin 2600 mm x 2) 7700 mm (Twin 3350 mm x 2)
Axis Y	500 mm
Axis Z	200 mm
On three faces	200 mm x 365 mm
Max displacement speed	
Axis X	80 m/1'
Axis Y	30 m/1'
Axis Z	40 m/1'
Axis C	7000 deg/1'
Movements of the electric spindle axes	
Axis C	+90 deg to -90 deg in 0,01 deg increments
Electric-spindle	
Cone attachment	ISO 30
Max power (S1 service)	5,5 kW
Max torque (S1 service)	8,7 Nm
Max rotation speed	18.000 rpm
Cooling system	Electric cooling fan
Tool magazine	
Revolver type	9 tools and 1 aggregate head
Accuracy	
Repetition on linear positioning	+/- 0,1 mm

Software

Over the years Tekna has specialized in developing software solutions and now offers a broad range of products.

To create programs that control the machines, Tekna provides user-friendly software tools that can be used both by professional CNC programmers, who can implement the most complex solutions, and by completely inexperienced users; after a few training hours the customer will be able to operate the machining centre using a graphical programming.

Software solutions offered by Tekna result from an accurate design and from the actual customer needs analysis. The simplicity of usage of these solutions reduces the management time and costs.

All machines come with **antivirus software** preinstalled.

■ CN6 Numerical Control

The Numerical Control basic software controls all functionalities of the machining center through an interface based on windows that includes:

- ↳ The user graphic interface (HMI, Human Machine Interface) displays all variables of the centre, both about programming and user configuration.
- ↳ Project file: simple, intuitive and extraordinary useful function of CN6 which can be used as interface between any management program/software and the machine. In a company it ensures a communication (i.e. a unique language) between the management function and the machine operators.
- ↳ 3D machining process: it is possible to import directly the .dxf file of the profile to be machined thus displaying a 3D image of the workpiece completed with the configured machining processes.
- ↳ Clamp positioning: automatic counting managed directly by the program; it can be run in different ways (static or dynamic) depending on the features of the desired machining cycle.
- ↳ The Scheduler function runs in several modes oriented both to a mass production and to a more flexible production in small quantity.
- ↳ Integrated **Formulas Software**: you can use it to define formulas based on the default variables (for example, the profile length) and then use them as macro parameters or within the "If" function.

■ ISO language editor

For numeric-control machines the international programming language ISO is used. With this language you can create programs to perform every kind of machining, with linear or interpolated paths, variable speeds, tapping, parameter use etc. and for managing all functionalities of the machining centre.

■ SLW Self-learning

With the Self-Learning SLW software the customer can easily create machining programs, selecting from a graphic menu a default number of functions (macros). The macro library generated by Tekna includes a large number of machining processes and it is possible to develop functions that increasingly simplify the man-machine interaction so that even an inexperienced user can very easily create several machining programs.

■ NC Tool

The NC Tool is a 2D CAD/CAM software tool that, starting from a CAD drawing, allows the operator to create CN6-compatible machining programs in ISO language by inserting information on the desired machining process.

Any changes to geometrical scales and to the dimensions of an existing drawing are automatically converted in a new updated ISO program. NC Tool can import/export .dxf and .dwg files, moreover it allows text editing and the subsequent generation of ISO codes.

■ TK Cam

Software package that allows the creation of ISO programs using a 3D graphic programming.

With TK Cam it is possible to assign machining operation regardless of machine models and tool series and view a simulation of the running program in a 3D representation. In TK Cam it is possible to optimize tools and clamps, it provides an anti-collision function and the automatic generation of ISO codes for the program. In the TK Cam it is possible to import specific .dxf/.dwg drawings and to assign the corresponding machining operations. In addition allows the interaction with the management programs commonly used in the window and door frame manufacturing industry.

■ TK CadX

TK CadX is a software allowing to import 3D models and to identify the workings that can be carried out by a numeric control machine. By importing files in STEP, TK CadX formats, it independently scans any surface, it analyses them and processes the necessary data for the workings of the pieces; these data are exported in a NCX file (format read by TK Cam) for the automatic generation of ISO working programs of any single machine.

■ ProfileCam

ProfileCam is a new Tekna software that provides a 3D graphic environment specifically designed for machining centers. ProfileCam has been designed and developed to better meet the needs of graphic design professionals for the positioning and the structure of simple machining processes and to help to cut costs with an extremely competitive price list.

TK 427N

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