

# Technical Specification

**TK 426/1**

3 Axis machining centres





TEKNA was established in 1964 to produce efficient aluminum machining systems.

The major role played by this material in the building industry has led TEKNA to develop, over the years, a vast range of products for manufacturers of window/door frames, curtain walls and coatings.

The increasing use of aluminum components in the automotive and transport industries as well as in the consumer industries and in other industrial branches has encouraged the search for new solutions: TEKNA has seized this opportunity and invested into it in order to meet the new demands of the market.

The experience gained in the window/door frames industry and the know-how accumulated in the field of machinery have allowed TEKNA to expand its product range, including 3-,4- and 5-axis machining centers for the machining of panels and profiles.

Over the past 15 years we have designed several models that have been customized according to the machining needs of our customers. TEKNA has developed different profile clamping systems for the machining processes, the movement controls and the suction systems of chips and dust.

Nowadays our company receives and answers to feasibility study requests every week, for this reason we can state that TEKNA is extremely qualified to provide effective responses to the most diverse problems.

Thanks to its vast experience, TEKNA can offer effective systems to be used in the manufacturing of window/door frames, curtain walls, industrial doors, garage door and panels, accessories for commercial vehicles, components for trains and underground trains, parts for the automotive industry, for telecommunication booths and many other applications.

**TK 426/1**

3-axis CNC vertical machining center.

Even if this model is purchased and used also by large multinational corporations, the flexible handling system of the TK 426/1 makes it particularly suitable for small manufacturing enterprises that often need to perform several tooling-ups due to frequent production changes.

Thanks to its excellent price/quality ratio, the TK 426/1 model represents a good starting point for those who wish to abandon their old machines with manual commands and to approach to industrial automation systems and to numeric-control machining centers.

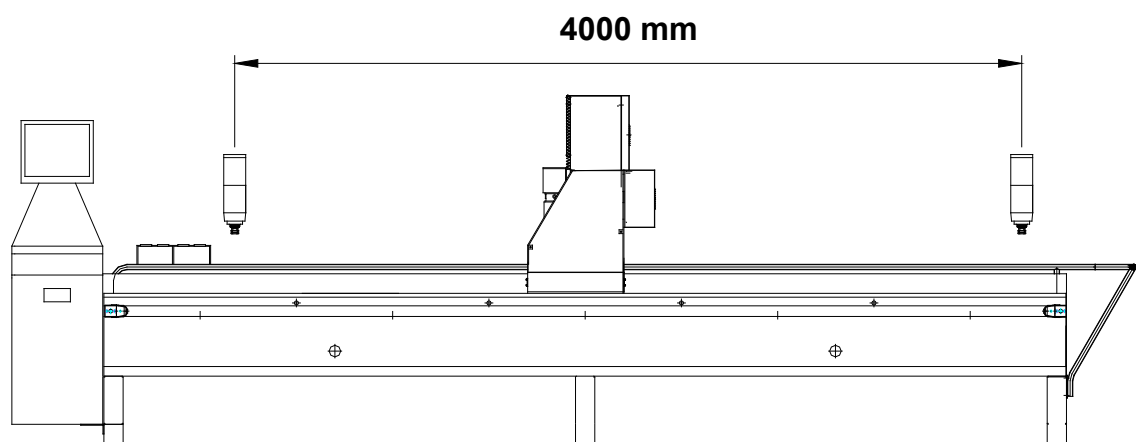
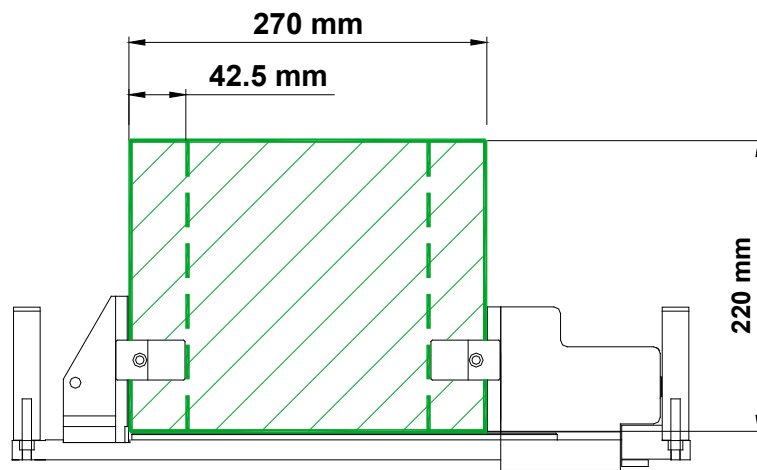
This machining center is designed for drilling and conventional milling processes and also for copy-milling operations on aluminum extruded profiles and other materials, including steel profiles up to 3 mm thick, steel reinforced PVC, and various other plastics or wood.



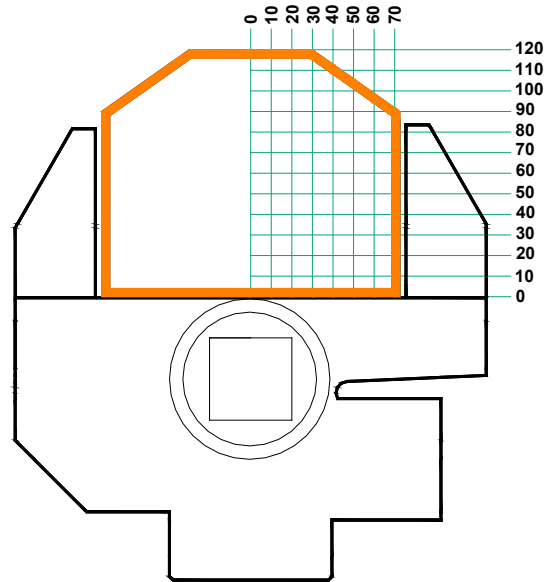
TK 426/1



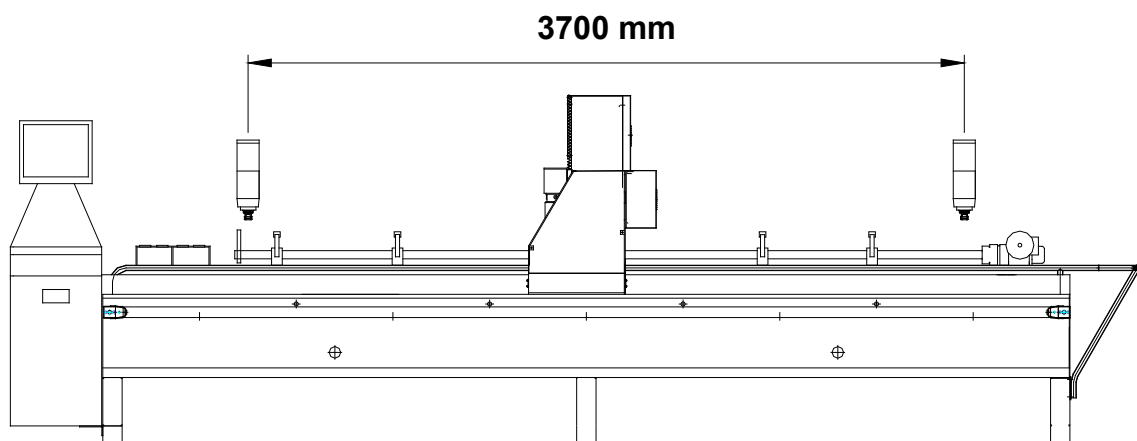
## Machinability



## Machinability with rotating clamps (optional)



Clamps can be equipped with specific extension arms that increase the maximum machinable width up to 225 mm. When using this system, it is not allowed to rotate the clamp.



## Technical features

<b>Machinability</b>	
Axis X	4000 mm
Axis Y	270 mm max
Axis Z	220 mm max
<b>Max displacement speed</b>	
Axis X	49 m/1'
Axis Y	14 m/1'
Axis Z	14 m/1'
<b>Control of axes</b>	
Axis X	Direct current motor, truck on hardened and ground slideways, precision rack
Axis Y - Z	Direct current motors, ball linear slideways and ball screws
<b>Electric-spindle</b>	
Cone attachment	ISO 30
Max power (S1 service)	5,5 kW
Max torque (S1 service)	7,5 Nm
Max rotation speed	18.000 rpm
Cooling system	Electric cooling fan
<b>Tool store</b>	
N° tools	4 tools + 4 optional
Tool change time	15" - 20"
<b>Accuracy</b>	
Repetition on linear positioning	+/- 0,1 mm



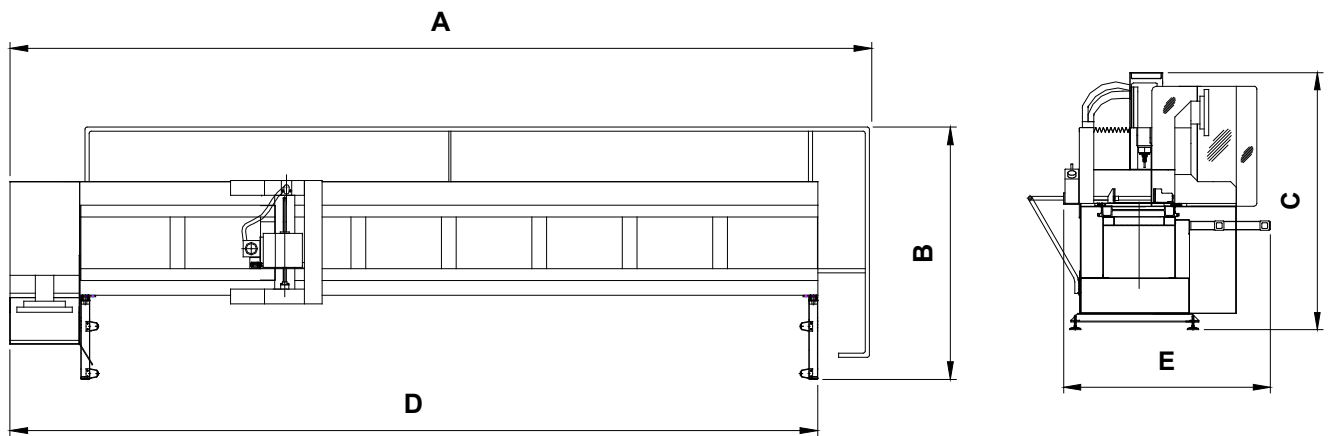
## Machining limits with electric-spindle on 0°

<b>Drilling from solid</b>	
Aluminium AL99	Ø 16
Steel FE370 D FF	Ø 12
<b>Rectilinear milling (maximum thickness)</b>	
Aluminium AL99	15
Steel FE370 D FF	3
<b>Tapping from solid</b>	
Aluminium AL99	M 10
Steel FE370 D FF	M 8
<b>Flowdrill: max screw threads</b>	
Cutting tap	M 8
Rolling tap	M 6

### Notes:

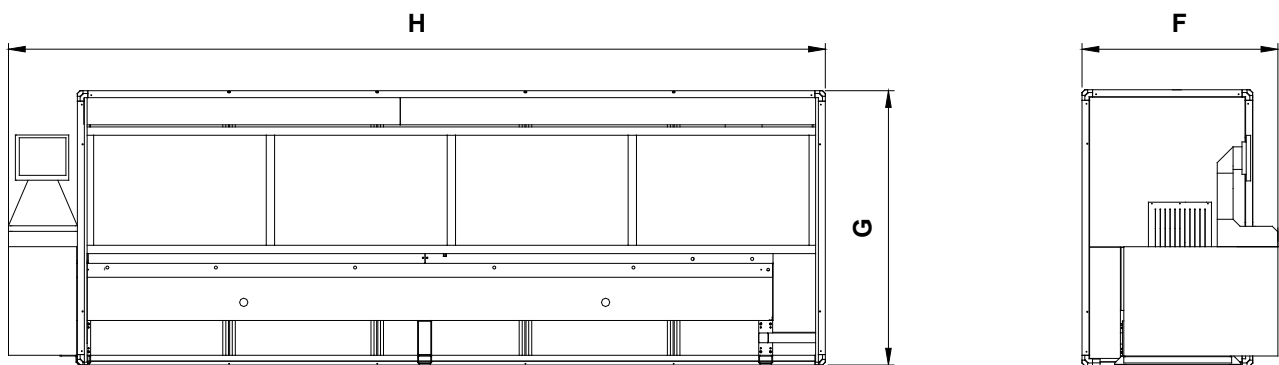
- The drilling and milling tools are the hard metal ones.
- Wider diameters can be obtained with the axes interpolation.
- Larger tappings can be obtained with the helical interpolation.
- The reported maximum screw thread sizes obtained with flow drill are valid for both aluminium and steel.

## Basic machine dimensions



Basic machine (mm)				
A	B	C	D	E
5840	1710	1900	5480	1460

## Machine dimensions with full protection



Machine with full protection (mm)		
F	G	H
1400	2000	5870

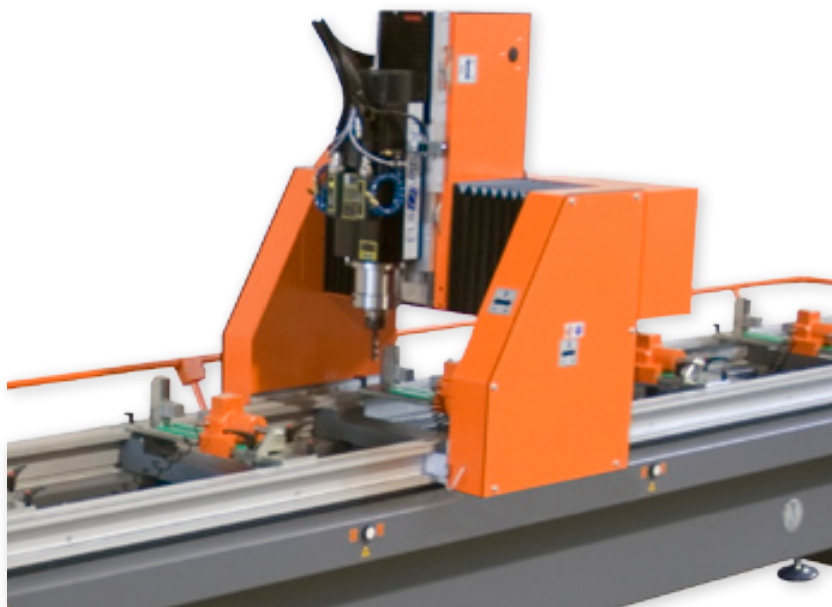
Weight (Kg)	
Basic machine	1100
Full protection	200

## Construction Features

The structure of the machining center features an electrically welded steel bed frame where hardened and ground slideways are mounted as well as precision rack that allow the movement of the milling head along the X axis. Thanks to the bed frame design it is possible to load bars longer than the machine working length.

The milling head is designed to provide a high Y and Z axis stiffness in order to minimize the vibrations that would compromise the machine precision and would negatively affect the quality of the machining process.

It is made up by a portal structure in aluminum casting that is composed of two lateral supporting elements and a top crosspiece. On this crosspiece linear slideways and the ball screws with recirculating balls are mounted for Y and Z axis.



## Linear slideways with recirculating balls

Linear slideways with recirculating balls are mounted in order to ease the electric-spindle movement along the Y and Z machining axis. The system comprises driving ground bars and carriages equipped with scrapers and weather strips that protect from chips and dust the two internal groups of recirculating balls.

These guides can stand similar traction and compression loads while keeping a low friction coefficient, a high resistance to vibrations and an optimal smoothness.

These characteristics improve the high-quality performance of machining centers: an efficient movement of the machine components that enables a high-precision positioning.

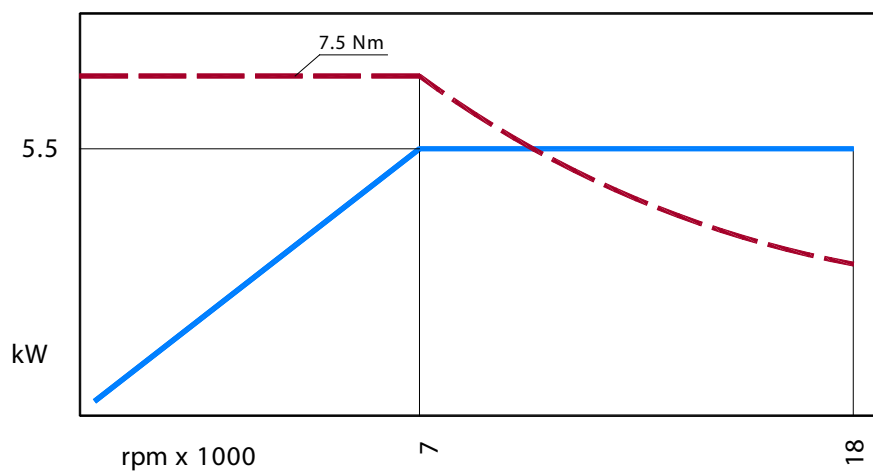


## Electric-spindle

The machining center has an electric-spindle which is equipped with an automatic tool change system with an electric cooling fan for maintaining a constant temperature and preventing the machine from overheating.

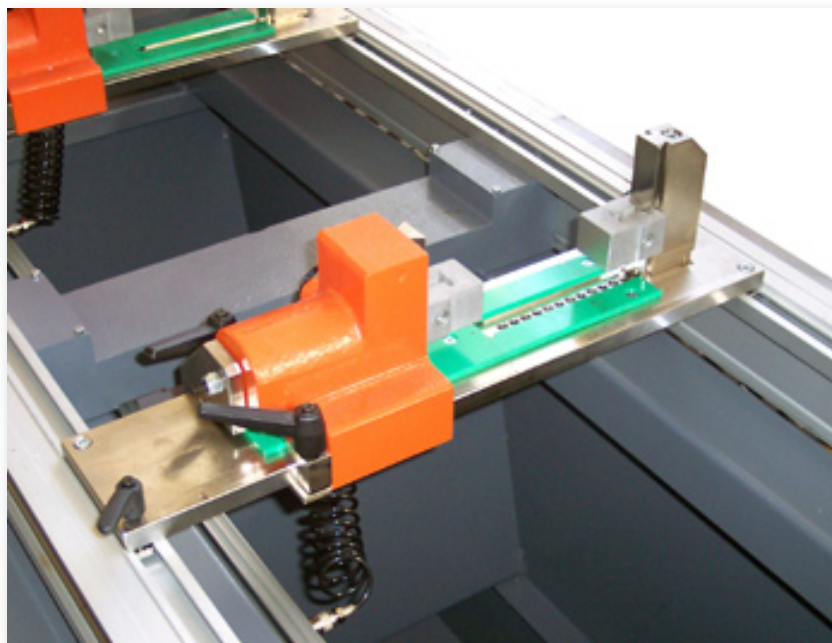
The fan operation is independent of the electric-spindle rotation, therefore the fan can work without interruption (even when the spindle is not rotating) thus providing an improved system cooling.

The max power is 5,5 kW in S1 operation mode, with a max rotation speed of 18000 rpm.



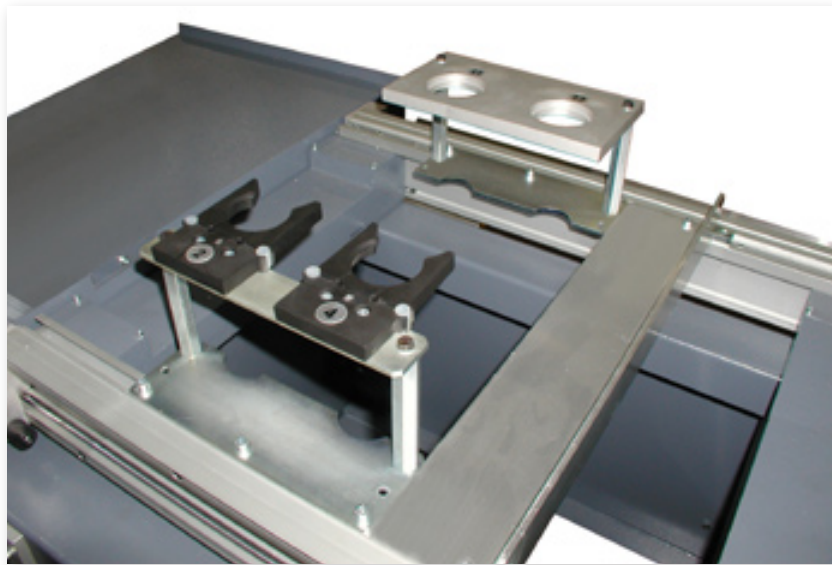
## Flat clamps

Pneumatic clamping system for the clamping of traditional profiles. The longitudinal and transversal positioning is achieved through manual adjustments.



## Fixed tool magazine

Fixed tool magazine that is installed on the left end of the machining center and can hold up to 4 tools. It is possible to insert an additional tool magazine or to provide the machine with different tool magazines that can be used to perform machining processes on profiles whose length is greater than the useful machining length (see optional), according to customer's needs.



## Safety protection

The TK 426/1 model is equipped with a safety light barrier system that prevents the operator from accessing dangerous zones when the machine is working: the operator is allowed to access the machine only when safety conditions are met. In addition, the TK 426/1 model is equipped with an external protection made of steel tubulars.

## Full automatic protection

The scope of the full enclosure is to protect the operator against accidental contacts with moving components of the machine and the produced chips and to reduce the noise level.

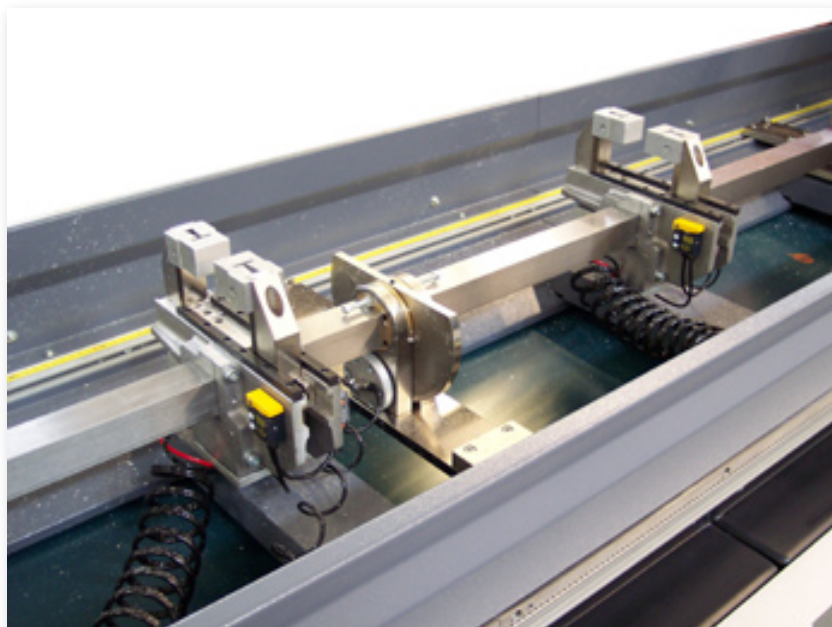
The enclosure is installed on three perimeter sides and on top of the machine, it is made up of insulating and sound-absorbing panels that can be removed for maintenance operations. It is provided with front shield made up by frame of extruded aluminum with transparent shields.





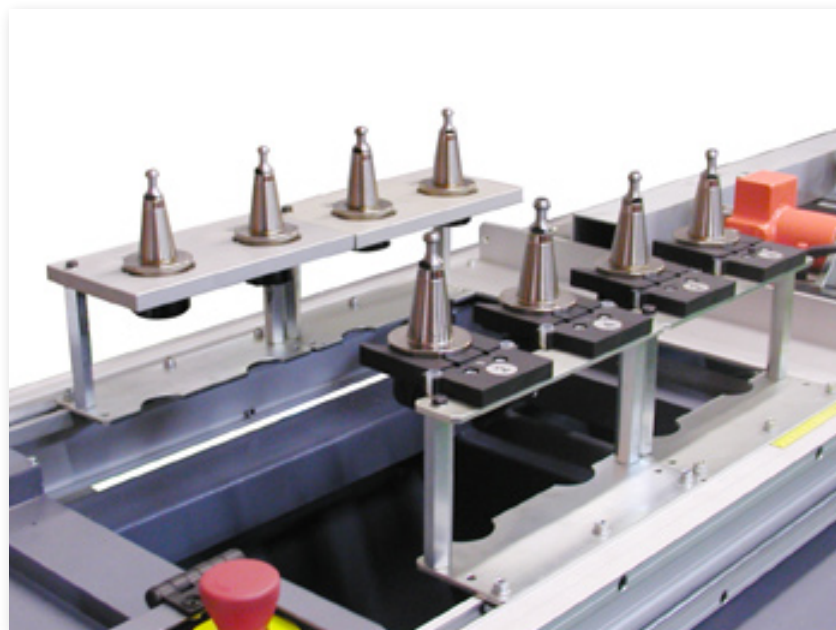
## Rotating clamps

CNC-controlled rotating clamps. This system is made up by a ground bar on which clamps with minimal space requirements are mounted that feature a pneumatic clamping control along the X axis. The rotating clamp enables to perform machining processes on 3 sides of the profile and in all angles between  $-90^\circ$  and  $+90^\circ$ .



## Additional tool magazine

Additional 4 position tool magazine that can be used both with fixed clamps and with rotating clamps, but without the extra-long functionality. It reduces by 240 mm the work capacity on axis "X"

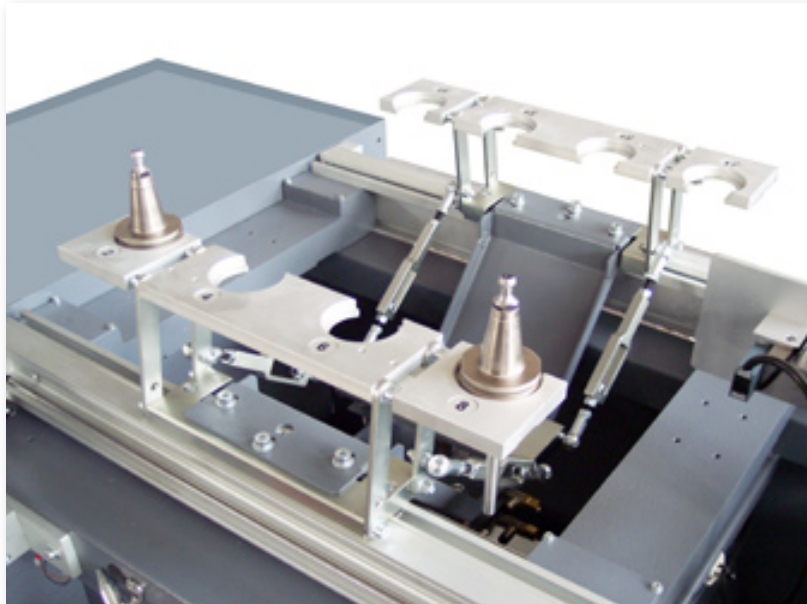


## Tool magazine for extra-long profile machining with fixed clamps

2 position tool magazine that can be applied to perform machining processes on extra-long profiles using fixed clamps. (max 6 tool)

## Mobile tool magazine for extra-long profile machining with rotating clamps

8 position tool magazine that features a pneumatic movement; it can be applied to perform machining processes on extra-long profiles using rotating clamps (until 7 m).



## Aggregate heads

Right angle gearbox that can hold one or two tools and that is equipped with a cone (ISO 30) compatible with the tool attachment of the electric spindle.

The aggregate head is used to perform:

- Machining processes where the electric spindle axis is not parallel to the Z axis
- Head machining



## Minimal Lubrication

Minimal lubrication system with micro-drop technology that optimizes the cooling liquid consumption during the machining. In order to guarantee a suitable cooling of the tool, this system allows also to distinctly reduce the quantity of the used product.



## Auxiliary container for cooling liquid (30 liter)

It reduces the duration of the machine downtime necessary to feed the standard tank; it is the ideal solution for continuous working cycles.



## Chip drawers

A set of 2 chip drawers is located in the lower part of the machine to collect the chips produced during the machining.

## Barcode reader

This device reads the labels applied on profiles and allows the system to automatically load the machining program and the transfer of some parameters of use. The reader is also available in “wireless” release.

## Anticollision light system with LED bars

This system allows to analyze any machining program and, through light indicators, to show the areas where clamps can be positioned in order to avoid collisions with the spindle.



## Voltage stabilizer

It stabilizes the machine voltage supply, even if some voltage losses occur.

## Hardware

The CN6 hardware is made up by two processors: A processor controls the CN6 and the other controls the functions of a common PC; thanks to this system you can use the function of the common PC even while the machining center is working.

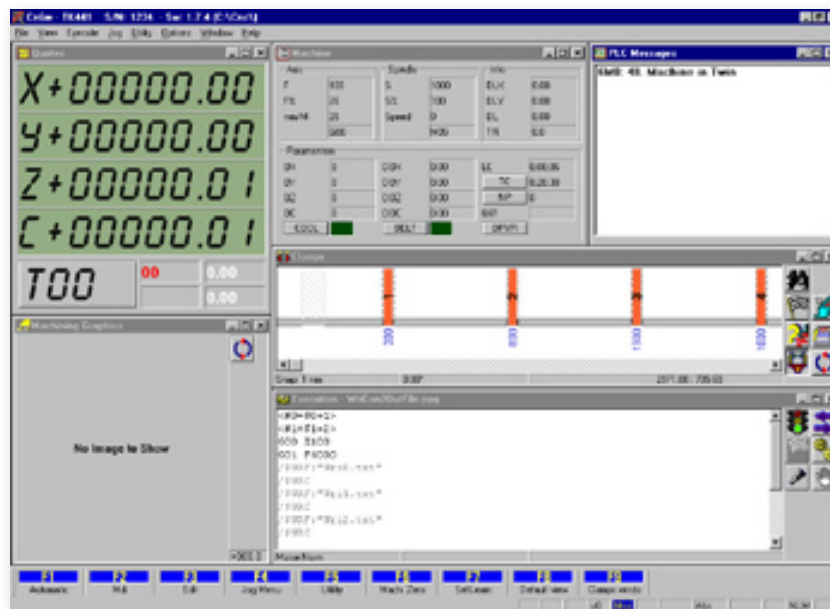
It includes:

- CPU PENTIUM card
- Keyboard, mouse, LCD 17" color screen
- Ethernet card for the network connection
- USB and parallel ports
- Axis and spindle speed control cards
- Hard Disk with minimum capacity of 40 Gb
- Modem for the direct connection via Internet

## CN6 Numerical Control

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

- ➔ User graphic interface (HMI, Human Machine Interface) that displays all variables of the center (for example spindle position, tool rotation and feed, etc.) and from which it is possible to activate some auxiliary devices (such as lubrication system, chips belt, etc.)
- ➔ User table that combines each tool with one or more performance such as rotation speed, penetration speed or milling speed
- ➔ A series of table with all configuring parameters of the center



## CN6

The CN6 license includes:

- ➔ Numerical Control management software
- ➔ ISO Language Editor
- ➔ SLW (Self-Learning software)
- ➔ Formulas Software
- ➔ Software for remote connection



## 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 center.

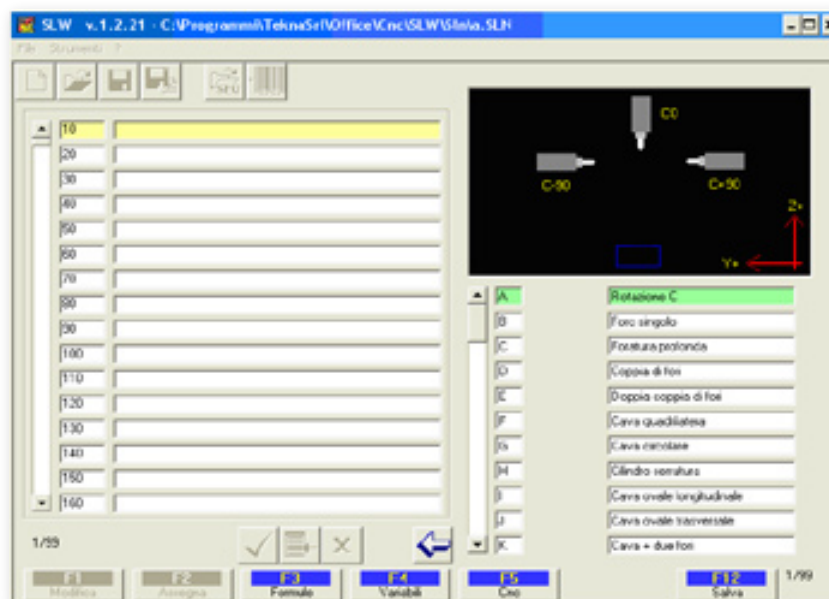
## SLW Self-learning

Tekna owns the SLW (Self Learning for Windows): a language of superior level then the ISO language. Thanks to a default number of functions (macros) that can be selected from a graphic menu, it is possible to easily create machining programs. Coordinates (values in X, Y and Z) must be assigned to each selected macro and other machining programs; each macro can be activated both as ISO and SLW program. During the selection and the setting of the chosen macros, these are translated in ISO language, thus creating a file that can be saved as machining program.

The macro library generated by Tekna includes a large number of machining; using this library an advanced user can create several machining programs very easily.

It is also possible to create and add to the macro library other specific macros customized by the client.

The Self-Learning SLW is very user-friendly: after a two-hour training even a beginner user can use the machine.





## Formulas

This is a software that can be used with Self-Learning SLW. You can use it to define formulas based on the default variables (i.e. the profile length) and then use them in the Self-Learning macros. This function is very useful when you have to perform same machining processes on profiles of various lengths. For example, the position in X of a hole can be set as  $L/2-50$ , where L must be correctly assigned (by inserting it manually, via a bar code reader or with a kind of automatism).

## Remote connection

This functionality allows to directly update the CN6, Maintenance and Technical Support on the machine, remotely via Internet using a telephone line (modem) or via a LAN (Ethernet card).

## NC Tool

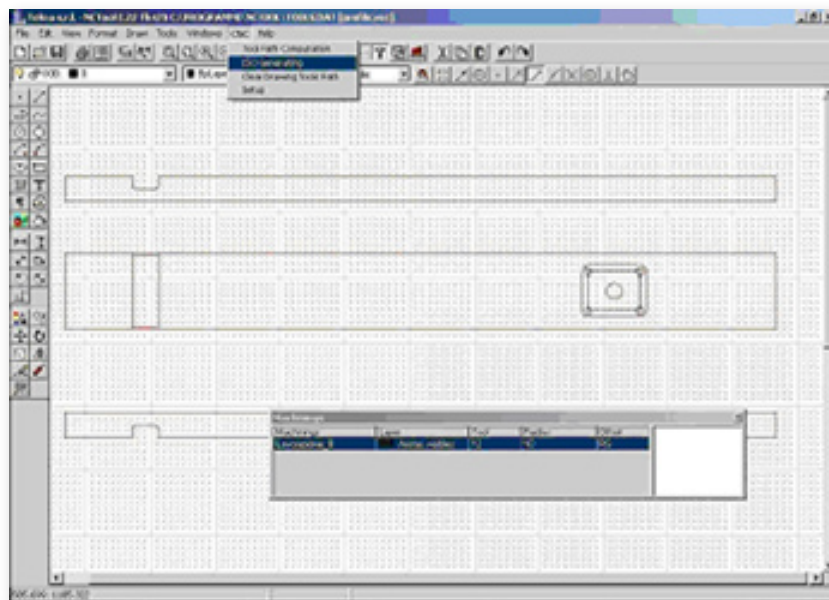
NC Tool is a 2D CAD/CAM software based on AutoCAD software: With the appropriate setting of the parameters, this software creates ISO programs that are CN6-compatible.

The main functionalities of the NC Tool software are:

- Drawing file import
- Easy setting of the desired machining
- Automatic creation of ISO programs that are CN6-compatible

Any changes to geometrical scales and to the dimensions of an existing drawing are automatically converted in a new updated ISO program.

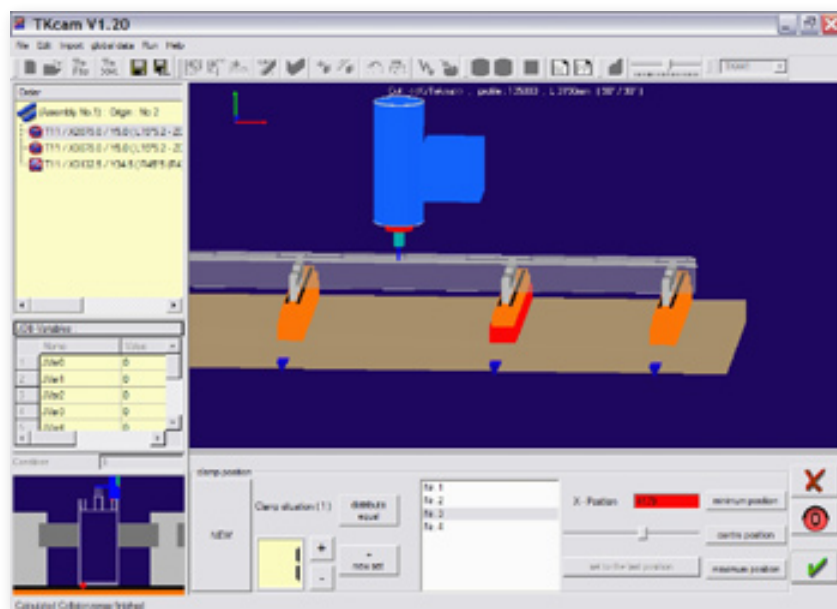
NC Tool can import/export .dxf and .dwg files, moreover it allows text editing and the subsequent generation of ISO codes.



## 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, details of the described machining processes can be imported in TK CAM in a generic .xlm format: This functionality allows the interaction with the management programs commonly used in the window and door frame manufacturing industry.



## TK 426/1

### 3 Axis machining centres

#### Branches

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TK Maquinaria  
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