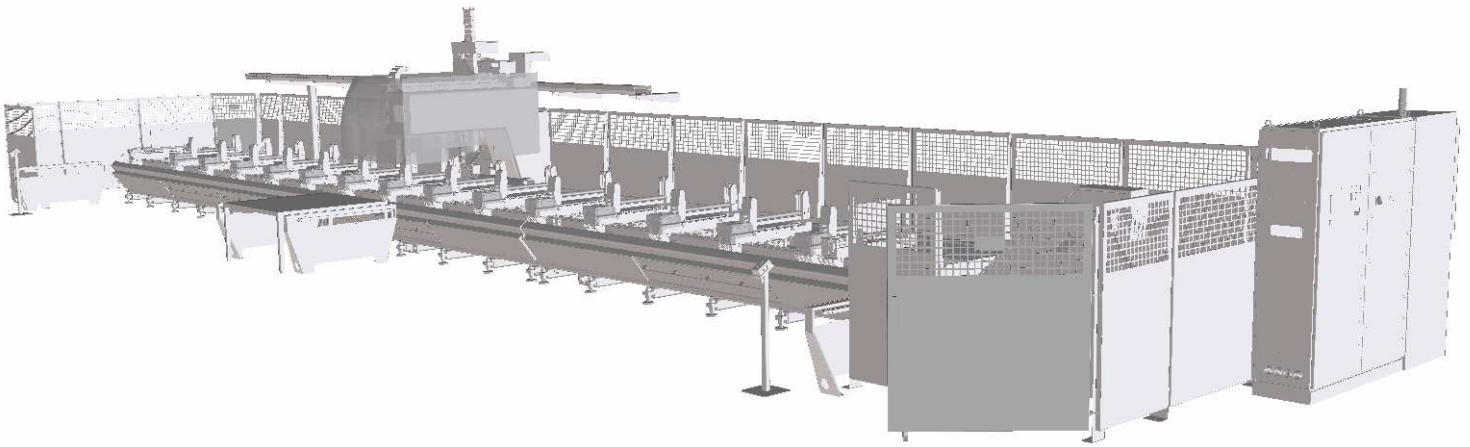# TITAN – version with partial guard

1.0 BASIC SPECIFICATIONS

1.1 Structure

The structure is made of a machine bed with a sliding carriage in its rear section. Both are in electrowelded steel duly stabilized after each work phase to ensure that there is no interior tension; they are sized to guarantee stability and precision during machining operations.

1.2 Axis sliding

The axis slide on high precision, robust, reliable linear guide-ways with recirculating ball blocks equipped with oil scrapers and with medium/high preloading.

1.3 Axis movement

The independent axis are controlled by brushless Yaskawa servomotors by means of:

- Pinion, rack and mechanical system for backlash recovery for X axis (longitudinal)
- High precision ground recirculating ball screw and preloaded lead for Y (transversal) and Z (vertical) axis. The Z axis drive is equipped with an electro-magnetic brake which is enabled if mains power is cut-off.
- Cinematic chain with ground gear for C and D axis of rotating head

The digital servomotors not only allow for short, optimal positioning and adjustment times, but also high head positioning speed. The position of the axis is detected by means of a rotating transducer.

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1.4 Spindle head

Very compact in size and made in ductile iron, it slides along a system of cross tables in electro-welded steel. A system for backlash recovery and encoder for directly reading the measurements guarantee maximum precision during machining operations.

1.5 Rotating electrospindle

Designed by Fom Industrie, this electrospindle ensures important performances, both at low number of revolutions as well as at high speed, to satisfy the increasing needs in terms of flexibility. The 17,5 kW (s6) electrospindle is equipped with constant torque and C and D axis for executing machining on 5 axis. Rotation speed up to 19,000 rpm, adjustable, forced air cooling, HSK E50 tool coupling and relative presence detecting micro-switch. The tools are locked into place mechanically, and released by means of a hydraulic system. Front and rear high speed precision bearings guarantee strict control of the electrospindle axial and radial stress during the work phases. The electrospindle rotation speed is managed by a static frequency changer (inverter), complete with:

- Display for visualization of diagnostics in case of anomalies.
- Protection from voltage and current overloads.
- Automatically controlled tool rotation braking action.
- Resistor for braking power dissipation.

1.6 Tools lubrication

Integrated in to the electrospindle, one of two systems can be used: emulsified oil with liquid recovery by means of a chips settling system, or pure oil by means of a sprayer with over-pressure device (minimal lubrication).

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1.7 Tools magazine

Located in a gate-protected area in the carriage, it has 24 slots, can rotate in both directions and is provided with an "absolut" encoder for detecting the position. The rotation movement is managed by a static frequency changers (inverter) which guarantees more precision and positioning speed.

1.8 Working area

Situated on the machine bed and made up of:

- 4 pneumatic vices (expandable) for locking the profiles. They slide on ground round-section bars with ball couplings. Movement/positioning is managed by the numeric control through a proper algorithm.
- 1 sliding pneumatic stop

Into the basement there are motorized chip conveyors (optional).

1.9 Electric cabinet

Equipped with filters for protection against emission and reception disturbances (EMQ); it is separate from the command console and contains the machine drives, the static frequency changer (inverter), the Power C numeric control complete with the machine control devices; it has an IP 55 protection grade against dust and liquids.

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1.10 FOM CAM   5 axis version

Graphic interface based on the Windows operating system for planning the machining operations and the pieces which automatically generates the CNC program that can be executed by the machining centre.

Program features:

- Easy to learn and easy to use, highly flexible
- 3D simulation of parts, tools and machinings
- Display the piece position on the machine
- Double cell machines management
- Vices and fixtures management
- Machining library for accessories
- DXF Profile Library
- Vice position optimization
- Automatic bar-code recognition
- Integration with ProF2 (window software)
- Cutting line and machining center management
- 5 axis machining

FomCam is the new easy-to-use CadCam solution for the 3D and 2D machining design on profiles. FomCam supports all FOM machining centers, the FOM 3, 4 and 5 axis machines and the cutting and machining lines. An intuitive software solution, FomCam was developed in close collaboration with expert machine tool users and manufacturers in the industrial and window manufacturing sectors. FomCam makes possible any kind of machining and ensures the quality of the NC code.

Simplify the working process

It has never been that easy to use a machining center: FomCam's user interface is extremely intuitive as it gives both 2D and 3D simulation options and offers a detailed summary of the machinings added on the part.
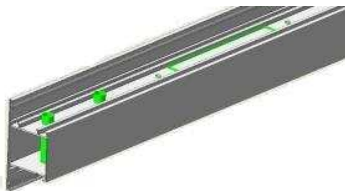
Vice and part positioning in the machine

FomCam automatically generates the CNC codes to be executed on the machine, considering single or double cell, left or right stop, or custom fixture setups for the simultaneous machining of more than one part. FomCam finds automatically the best strategies for vice positioning and simulates the toolpath before the machine starts the job.
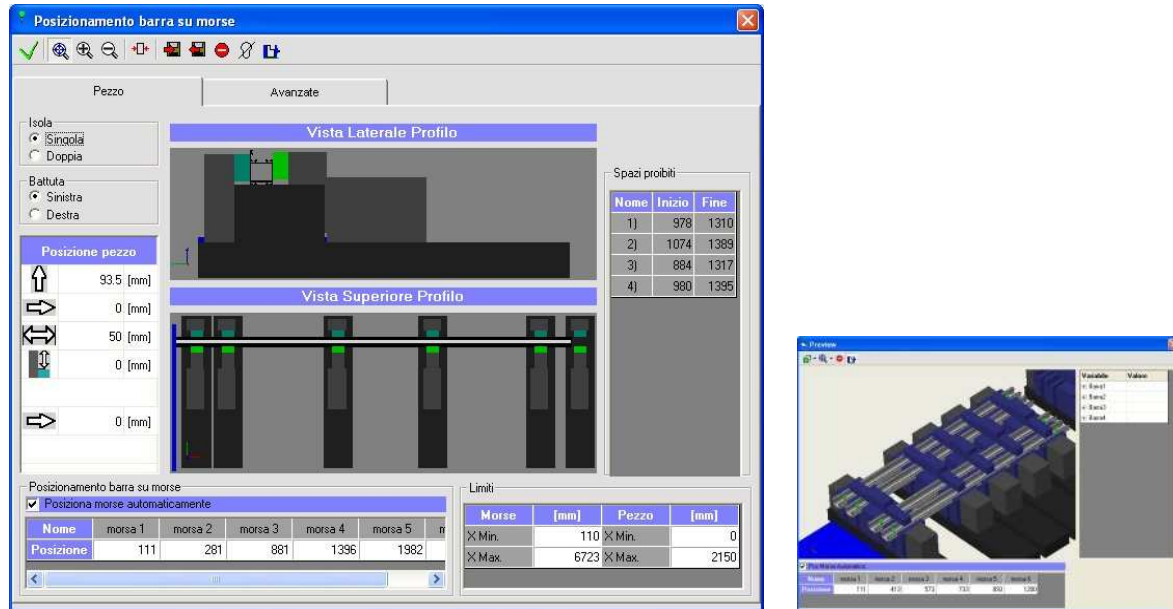
Parameterized machinings

The machinings are parameterized. They are easily modified, edited or repeated by changing the numeric data in the model. FomCam applies the update to each machining in real time.

Machining optimizations

To make the machining even faster, the software automatically minimizes the numbers of tool changes and spindle movements saving considerable time.

Libraries

FomCam manages the Profile libraries with 3D and 2D views, the machine's Tool Libraries and the Machining Libraries of the single profiles.

Add the machinings for memorized groups

FomCam lets you proceed rapidly with the machinings for an accessory: just select a code from the accessories list and the X-position on the piece: all machinings referred to the accessory, including the tool data, will be added automatically.

Maximum production control

FomCam directly controls the machining center as it transfers the CNC code and controls its execution. It is not necessary to exit the program while the center is working.

More productivity through automation

The machining cycle starts with the scan of the bar-code on the part. Based on the bar-code data, the center starts the machinings that were defined for this part in the Accessories Library. FomCam also allows to interrupt and re-start the machining list and to view the status info of each part, i.e. the total of repetitions requested and the number of repetitions executed so far.

High-efficiency dual station machinings

Save even more time and avoid production still-stands using the FomCam dual station machining functions. These functions allow to position the vices in one cell while the other cell is working without interruption.

FOMCAM - SIMULATION

Simulate every step of the NC code generation with the intuitive FomCam graphical interface. The visualisations of the components, machinings and tools are 3 dimensional, and the view points can be changed with a simple mouse-click. The 3D views also include different vice setups with multiple components.
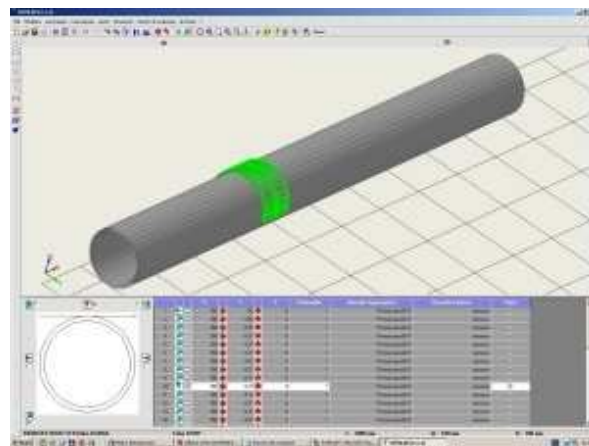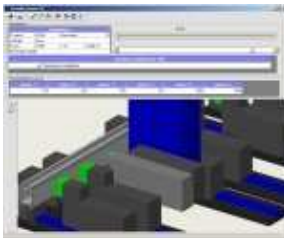
FOMCAM - OPTIONAL MODULES

FomCam also offers a series of optionals based on different needs.

Machining time calculation

Based on the simulation functions, FomCam calculates the exact cycle time of a machining before starting it. FomCam also shows the time schedule within the various machining stages. This calculation is also possible for a list of pieces, including the repetitions, as an estimate of the production time of an entire order.

Tempi di lavoro (Stima)		
Nuovo		
Totale tempi	**39**	**sec**
Tempo di cambio utensile	15	sec
Tempo di rotazione	8	sec
Tempo per movimenti rapidi	4	sec
Tempo per movimenti interpolati	6	sec
Distanza percorsa in movimenti rapidi	863	mm
Distanza percorsa in movimenti interpolati	62	mm

Nuovo

KEY
- Tempo di cambio utensile (15)
- Tempo di rotazione (8)
- Tempo per movimenti rapidi (4)
- Tempo per movimenti interpolati (6)

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## FOMCAM AND PROF2 INTEGRATION PACKAGE FOR WINDOW AND DOOR MANUFACTURERS

A software solution that enables window and door manufacturers to take advantage of FomCam, as it integrates with the window and door design program ProF2. This integration package will design windows, doors and curtain walls, define the machining strategies and generate the cutting and machining lists. Design the structure and select the profiles with ProF2. Use FomCam to define the machinings for each selected part and the program automatically calculates both the cutting and the machining lists. The optimized cutting list is transmitted to the sawing machine. The sawing machine bar codes and labels the part. The machining center reads the label and executes the machinings as defined by FomCam.
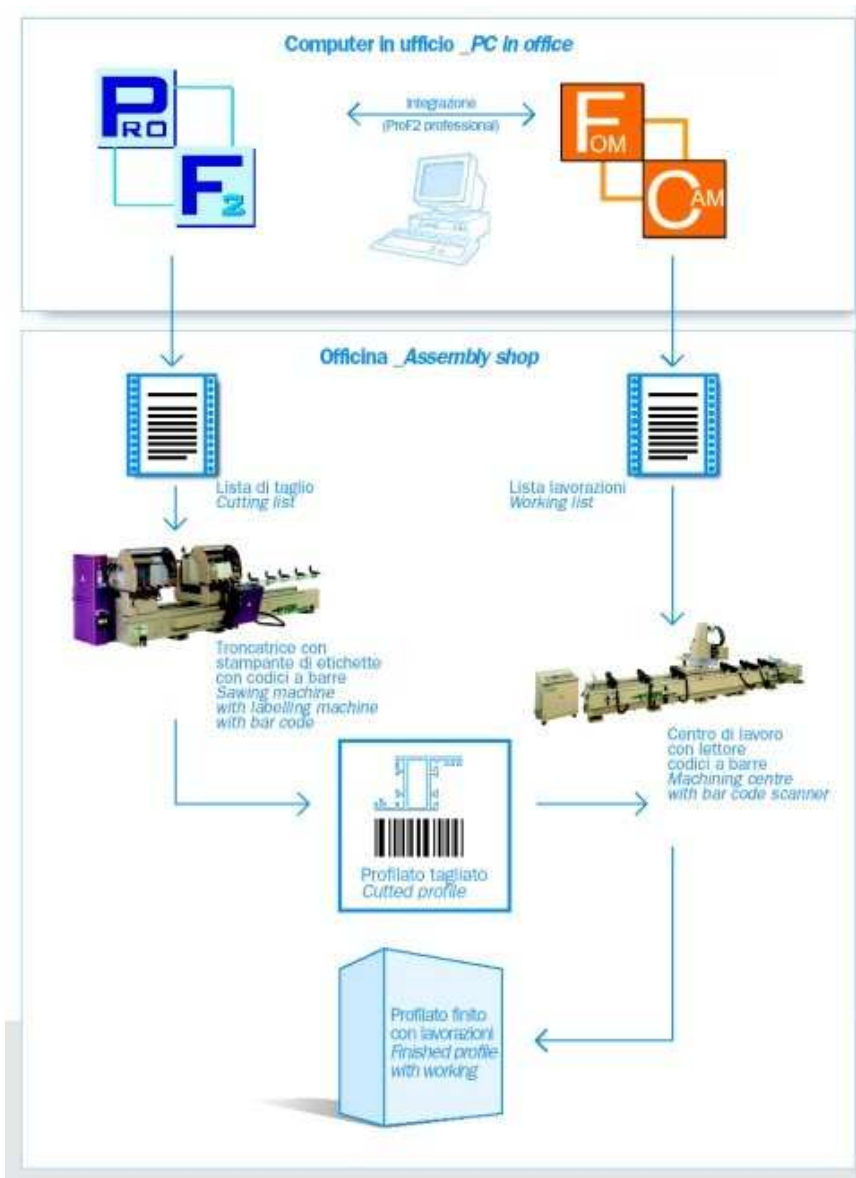
Machinings from DXF

The Machinings from DXF module imports and reads any type of machinings starting from a DXF. This tool allows to create any kind of form for a machining without involving DXF.
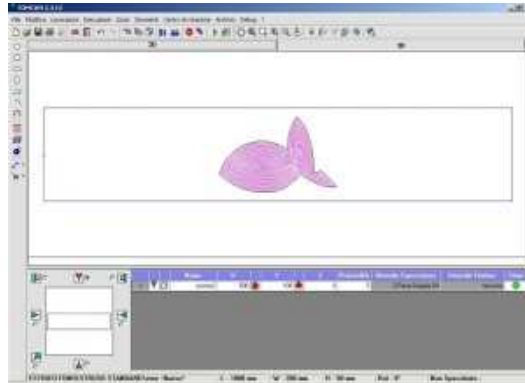
Bar code reader

Reads the bar code and starts the machinings on the selected piece.

Wizards and guided compositions

This module offers some useful features:

In security shutters, it generates automatically the position of the blades. It lets you insert pre-holes into steel machinings. It allows to design bands as a single block and to perform the machinings dividing it into many pieces.

Cut and Separate" module

Using the "cut and separate" module makes it possible to load the entire bar onto the work table. The machine will then cut the pieces at the set measurement which, by remaining perfectly clamped, are automatically separated making use of the vice-controlled positioning. In the next piece machining phase it will be possible to machine the head and tail of the separated pieces.

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1.11 FST Solid

FST Solid is a program for reading STEP type files containing a three-dimensional drawing of a piece and to import the geometrical data of the machining operations on the piece.

Recognition of the position, type and pattern of the machining operations on the piece takes place automatically, and the user can manually change the dimensions, tool direction and technological parameters of each machining operation by means of a simple and intuitive user interface.

FST Solid automatically recognises most machining operations such as holes, double holes, milling and cuts. Additional CAD instruments are used to add and/or modify the machining operations entered. The ISO or CNC program for the machining centre is automatically generated from the file re-worked with FST Solid.
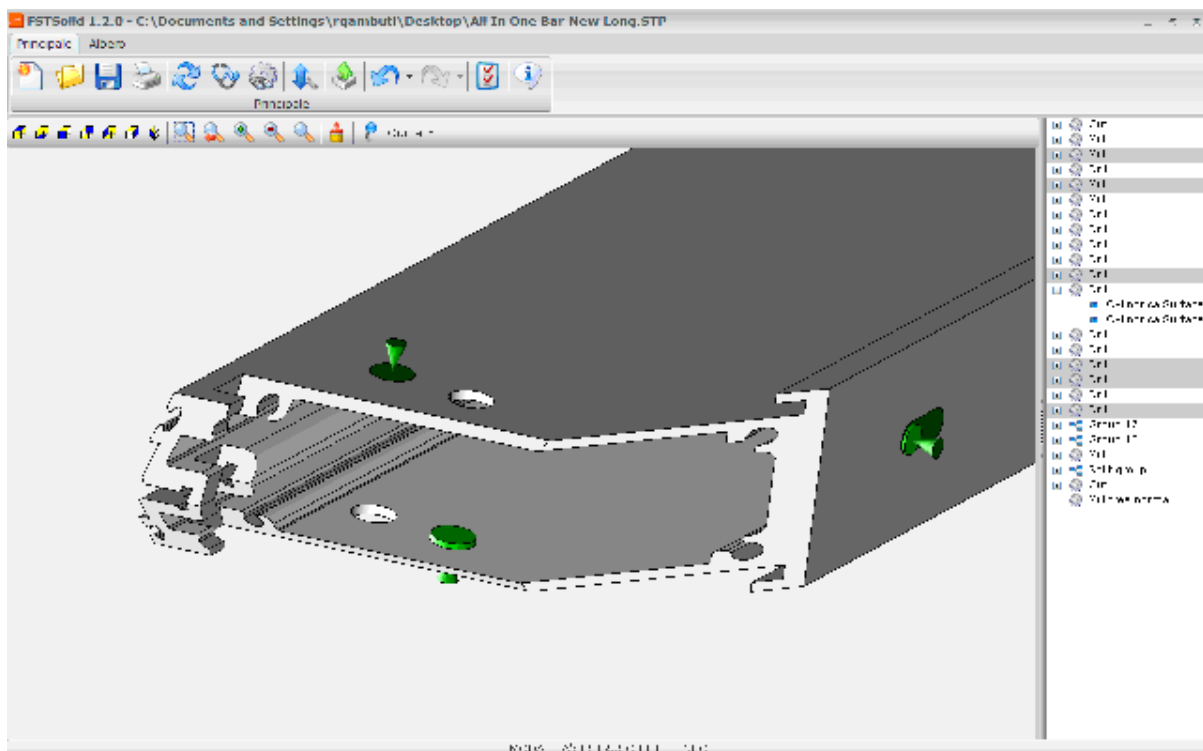
Technical characteristics:

- Imports STEP files
- Automatic recognition of cuts, holes and milling
- 3D visualisation of machining operations
- Visualisation of the tool direction and entry points.
- Assisted manual entry of operations directly onto on 3D drawing.
- Option of dividing complex operations or several simple operations.
- Automatic tool assignment or importing technological parameters
- Integrates with all FOM machining centres
- Imports geometrical, pattern and position data of machining operations from a STEP type file.

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1.12   Command console

It incorporates the user interface made up of a PC, pendant push button strip, Display and alphanumeric keyboard; it includes:
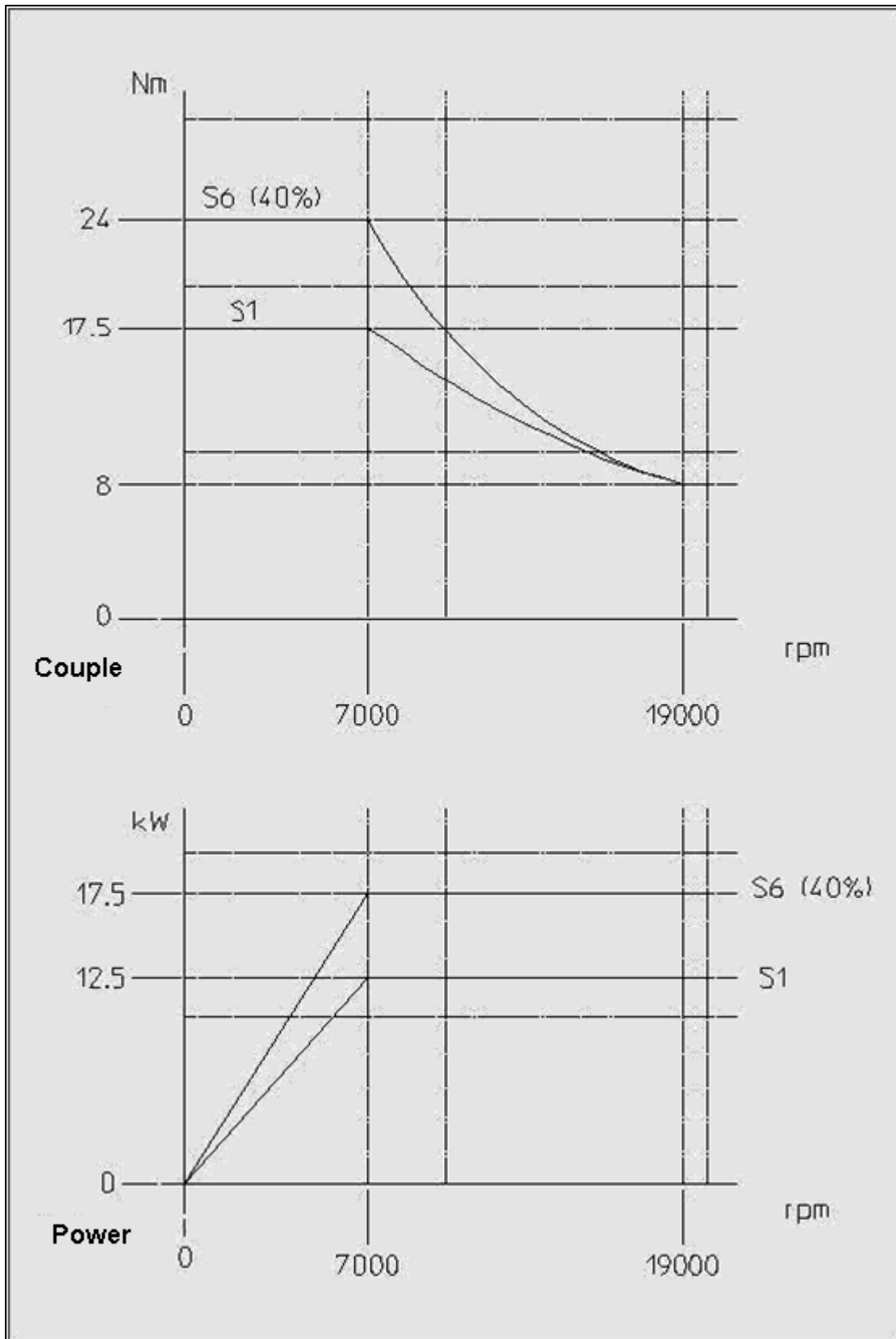

- Connection to laser bar code reader.
- Connection to remote control units (handhelds)

1.13   Protection and safety devices

In compliance with the requirements of EC directive 98/37/EC and successive modifications, the protection and safety devices are made up of:

- Acoustic insulation head cap.
- Mechanical cams and safety micro switches for operator protection during dual station operations.
- Photoelectric cell barrier.
- Rear and lateral fences and swinging gate

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Couple/Power electrospindle characteristic curves

Couple

Nm

S6 (40%)

24 —

S1

17.5 —

8 —

0 —

rpm

0   7000   19000

Power

kW

17.5 — ————————————— S6 (40%)

12.5 — ————————————— S1

0 —

rpm

0   7000   19000

Technical specifications with partial guard

Axis Travels			
X Axis – Longitudinal travel		mm	See Table 1 column C
Y Axis – Transversal travel		mm	1.345
Z Axis – Vertical travel		mm	595
C Axis – Rotation electrospindle // X axis			-190/+190°
D Axis – Rotation electrospindle tilting 45°			-100/+100°

Working area			
X Axis	Longitudinal travel	mm	See Table 1
Y Axis	Transversal travel with electrospindle 90°	mm	650
	Transversal travel with electrospindle 0°/90° /180°	mm	900
Z Axis *	Vertical travel	mm	400

Axis movement			
X Axis	Rapid traverse	m/1'	75
Y Axis	Rapid traverse	m/1'	50
Z Axis	Rapid traverse	m/1'	30
C Axis	Speed max	°/sec	90
D Axis	Speed max	°/sec	195

Electrospindle			
Cone			HSK E 50
Power 17,5 Kw (S6)**	Max torque	Nm	24 (S6)
	Max rotation speed	rpm	19.000

Tool Magazine			
Max tools		N°	24
Max tool weight		Kg.	10
Maximum tool diameter disk-type milling-cutter		Ø mm	450

Overall dimensions			
Lenght		mm	See Table 1 column A
Width		mm	3.500
Heigth		mm	2.671

*For working length on lower face the max high of the profile that it can be worked is 300 mm (Fig.1)

**For performance at constant torque and power and at maximum torque see the graphic "Electrospindle characteristic curves", and the same applies for the performance of the electrospindle in service S1-100% and S6-40%

Table 1 _ X Axis travel
## Technical specifications with integral head guard
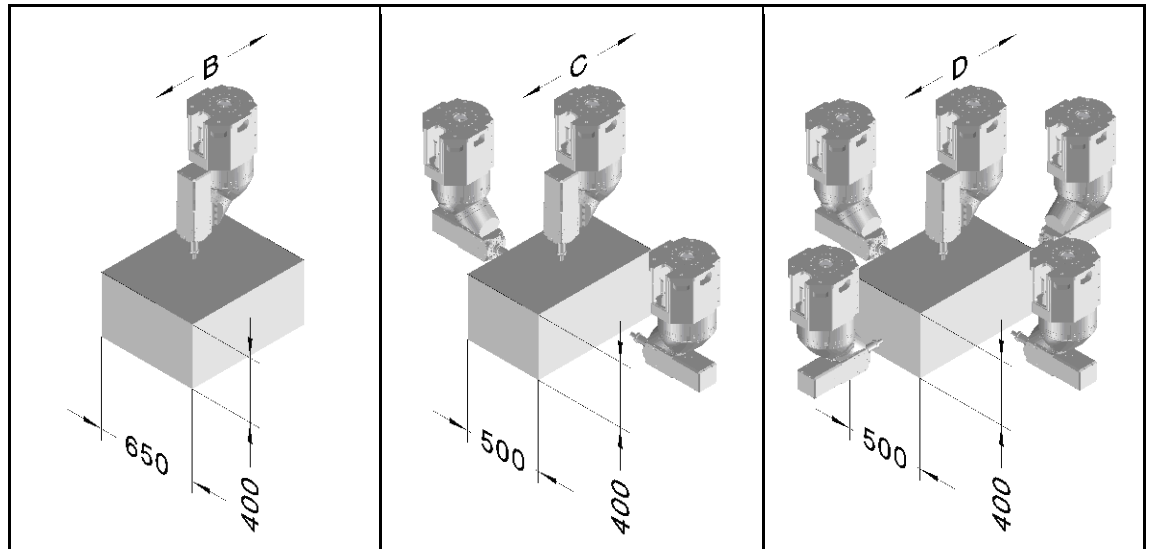
	A (Basement)	B (X Axis) (Working area only upper profile side)	C (X Axis) (Working area on 3 sides/X axis travel)	D (X Axis) (Working area on 5 sides)
1	6030	4390	3950	3050
2	12030	10390	9950	9050
3	18030	16390	15950	15050
4	24030	22390	21950	21050
5	30030	28390	27950	27050
6	36030	34390	33950	33050
Working area datas are valid with tools/tool holder with length 140 mm				

Fig.1

Max height profile for working on bottom side 300 mm

1703   A   2455   564

5122

2726
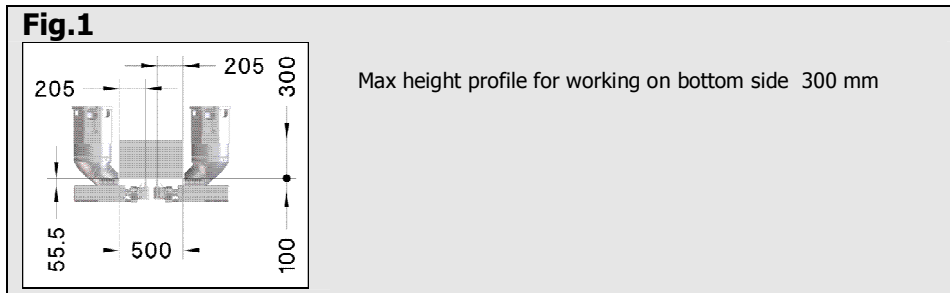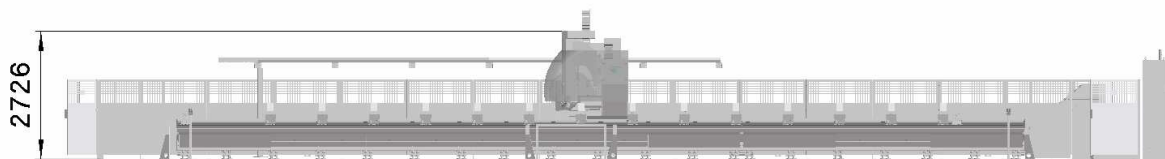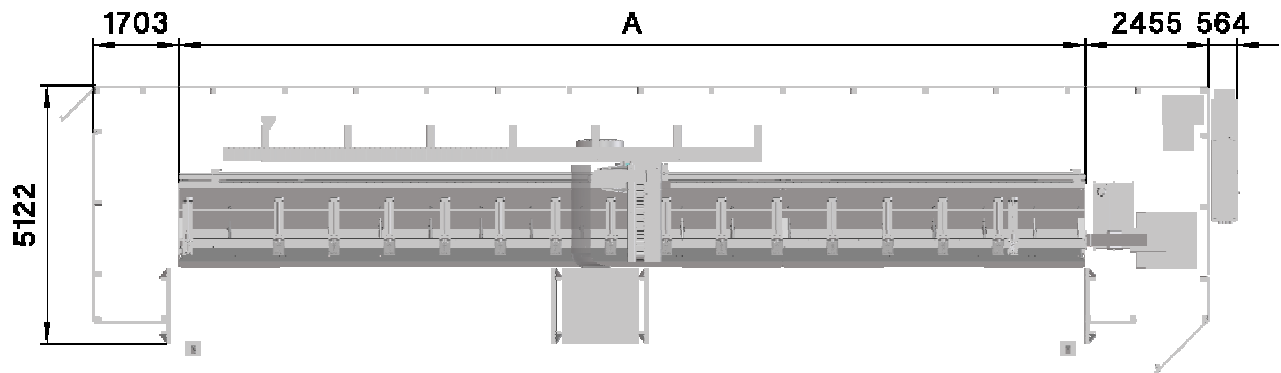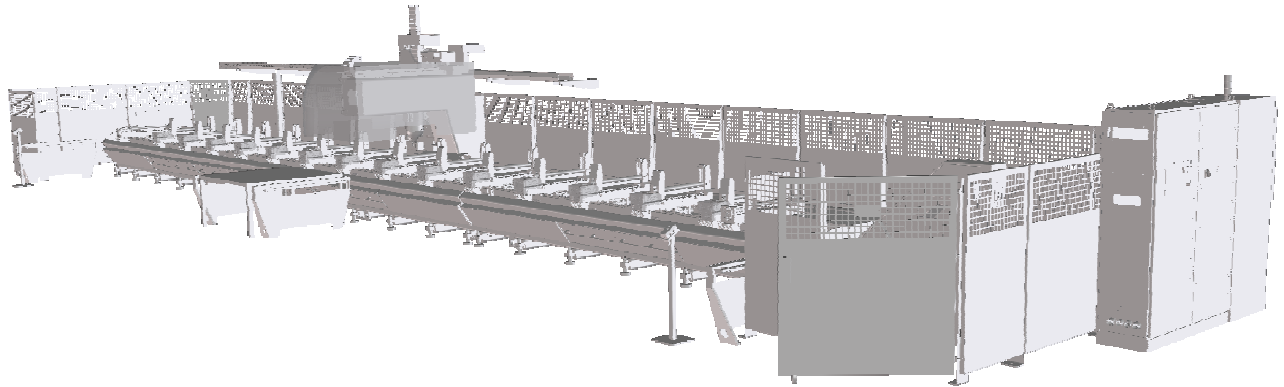
SPECIAL VOLTAGE MOTORS / PLANET VERSION UL-CSA:

Description	Code
Additional charge for special voltage and cycles (external transformer) (Standard motor 380-460V three-phase 50/60Hz)	
Additional charge for electrical equipment in compliance with UL-CSA standards. (The additional charge includes the electrical equipment with cables and special components/measurement unit in inches)	

OPTIONAL:

TOOL MAGAZINE:

Description	Code
Surcharge for 30-position tool magazine Note: Housing of blade-holder cone not possible	
Tool magazine for housing blade-holder cone (maximum blade diameter 450 mm)	
Kit for integrated tool presetting	
Pair of pneumatic supplementary vices Note: A pair of vices recommended every 2m of working area beyond the 4th metre	
Pair of electrical supplementary vices Note: A pair of vices recommended every 2m of working area beyond the 4th metre	
Surchage for transforming no. 4 pneumatic vices into electrical vices	
Dual station with supplementary electrical retractable stop **Note: A minimum of 2 supplementary vices necessary**	
Rear mechanical chips extractor	
Front mechanical chips extractor	
Profile stop on rh side for machining long pieces or two pieces without alternating machining mode. **Note: Accessory not available with alternate machining option**	
Angular head for machining on bottom side of profile	
Surcharge for micro-drop pure oil blade lubrication system	
Microdrop lubrication for machining with angular heads	
Lubro-cooling with liquid recycled into tank. Note: Water/oil emulsion	
Flowdrilling. **Note: Not including oil for machining**	
Couple of fume exhausters mod. Losma (only for CZ Version) **Note: A minimum of 2 exhausters recommended every working area**	
Surcharge for integral guard **Note: only for Titan 012 version**	
Machine handling kit	

SOFTWARE:

Description	Code
Software **licence** for office **FOMCAM 5 axis version** program	
FST Solid – Module for machining operations recognition starting from a three-dimensional STEP file	ZP-26868
Software licence for "Cut and Separate" module	
Kit for the insertion of geometries 'defined by the user' and import of drawings in DXF format for **FOMCAM**	ZB710210
Kit for the importation of CNC data **by means of FOM protocol** for **FOMCAM**	ZB710214
Kit for the importation of CNC data **by means of a non FOM** protocol for **FOMCAM**	ZB710238
Remote control for axis movement	ZD-75642
Barcode optical reader (ZB710214)	PR-26895
Barcode optical reader (ZB710238)	PR-27042
Wireless optical reader for barcodes and relative software for managing work lists with CNC data import module by **means of FOM protocol** for FOMCAM (ZB710214)	PR-27302
Wireless optical reader for barcodes and relative software for managing work lists with CNC data import module by means of **third party protocol** for FOMCAM (ZB710238)	PR-27303
Software licence for **"Clock"**, module for **FOMCAM** time calculation	ZB710453
Software licence for **"Wizard"**, module for **FOMCAM**	ZB710598
Software licence for **"Production"**, cutting lists management.	ZP710562
Working module Production and integration with **FOMCAM**	ZP710563

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