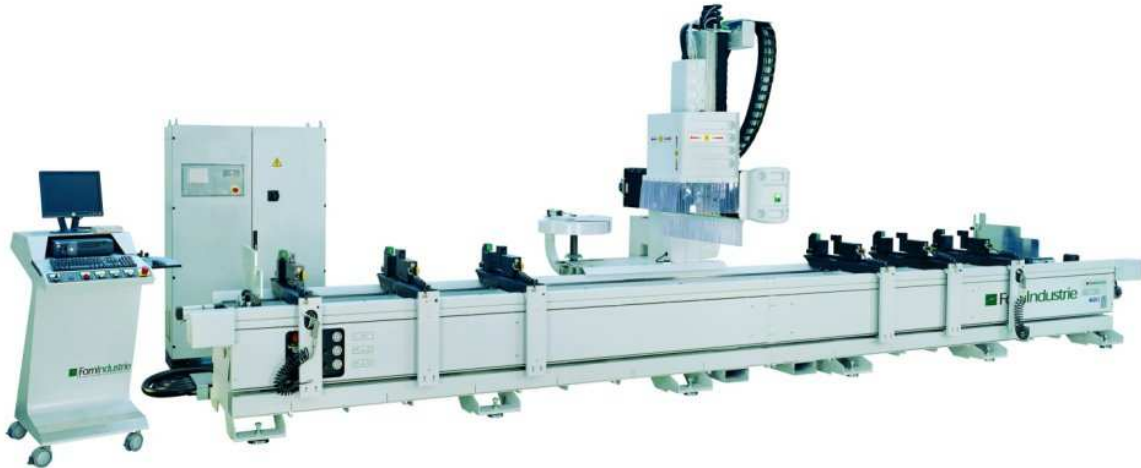


## FLEN



### 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 Axes sliding

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

#### 1.3 Axes movement

The independent axes 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) axes. The Z axis drive is equipped with an electro-magnetic brake which is enabled if mains power is cut-off.

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

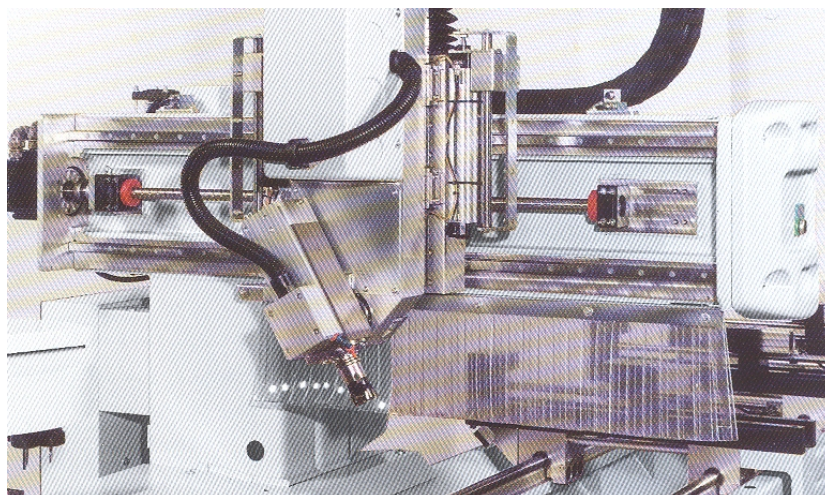
## 1.4 Spindle head

Constructed with a system of crossed tables in ASTM 7075 to obtain a reduction in weight, high resistance to loads and accuracy in the mechanical work they perform, all at the same time. The solution used has considerable advantages in terms of machining precision and maintenance.

## 1.5 Electrospindle

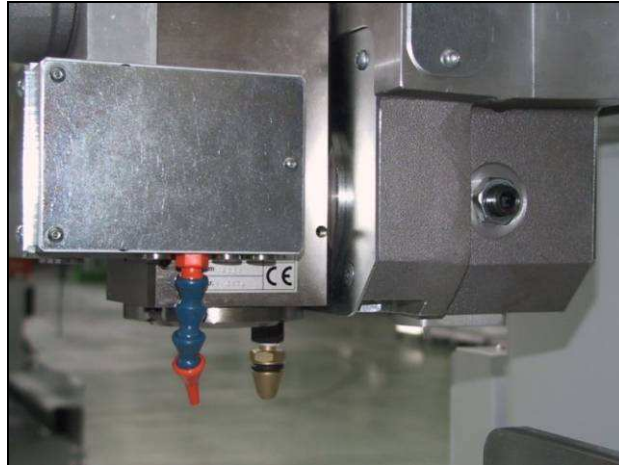
Designed by Fom Industrie, this electrospindle ensures important performances, both at low number of revolutions as well as at high speed, to satisfy the increasing needs in terms of flexibility. The 4kW electrospindle is equipped with constant torque and a A axis for executing machining on three faces of a profile and, if necessary, on intermediate positions, rotation speed up to 12,000 rpm, adjustable, forced air cooling, ISO 30 DIN 69871 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 A axis, controlled by a brushless Yaskawa servomotor, is equipped with a linear transducer for position detection, position mechanical retention and a 0°/180° positioning time of 1". 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

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).



## 1.7 Tools magazine

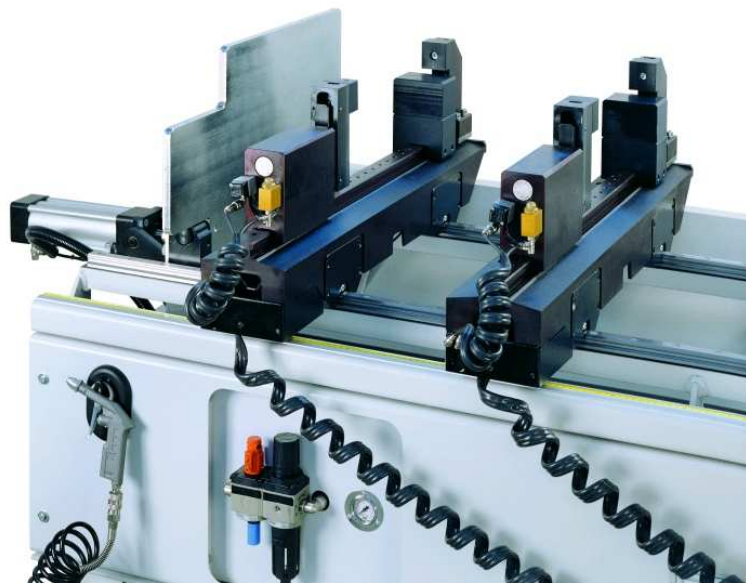
Located in a gate-protected area in the carriage, it has 12 slots, can rotate in both directions and is provided with an "absolut" encoder for detecting the position. The rotation movement is managed by a static frequency changers (inverter) which guarantees more precision and positionig speed.



## 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 and pneumatic locking. Movement/positioning is managed by the numeric control through a proper algorithm. Clamping jaws are positioned using a patented pushbutton system. Patented pivoting clamping system ensures optimum adhesion to the profile.
- 1 sliding pneumatic stop.



## 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 Vision numeric control complete with the machine control devices; it has an IP 55 protection grade against dust and liquids.

## 1.10 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)

### 1.11 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.

## 2.0 CONTROL EQUIPMENT

### 2.1 Omega 200

Made up of:

- Mobile control console
- Extractible shelves (right and left) for mouse support.
- Network to machine electrical cabinet with RJ 45 attachment for the network line
- Network to VISION numeric control for the working programs
- Optical USB mouse
- Pendant push button strip complete of potentiometer for the adjustment of the overfeed of the axes
- Colour display with flat screen TFT 17"
- USB English Keyboard
- Laser gun for bar code reading (available on request)
- Remote unit with display for axis movement (available on request)

PC **PENTIUM 4** comprising:

- Front loading CD-ROM 24X
- Front loading 3,5" 1,44 MB disk drive
- 40 GB Hard disk (7.200 rpm) or higher
- 2 serial ports
- 8 USB ports (6 back, 2 front)
- 512 MB Ram memory
- Ethernet network card: 10/100 Mbps
- ATI Radeon X300 128MB graphic card
- Interior loudspeaker

Follow programs :

- **Windows XP Professional SP2.**
- **FomCam.**
- **Vision Interface 4** software for managing blocks of manual control and service on line - assistance interface

## 2.2 FOM CAM



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.

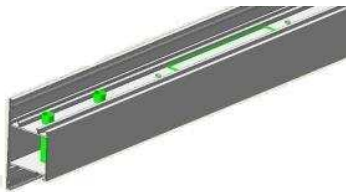
Program features:

- 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
- Vises and fixtures management
- Machining library for accessories
- DXF Profile Library
- Vise 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.



## **Vise 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 vise 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.

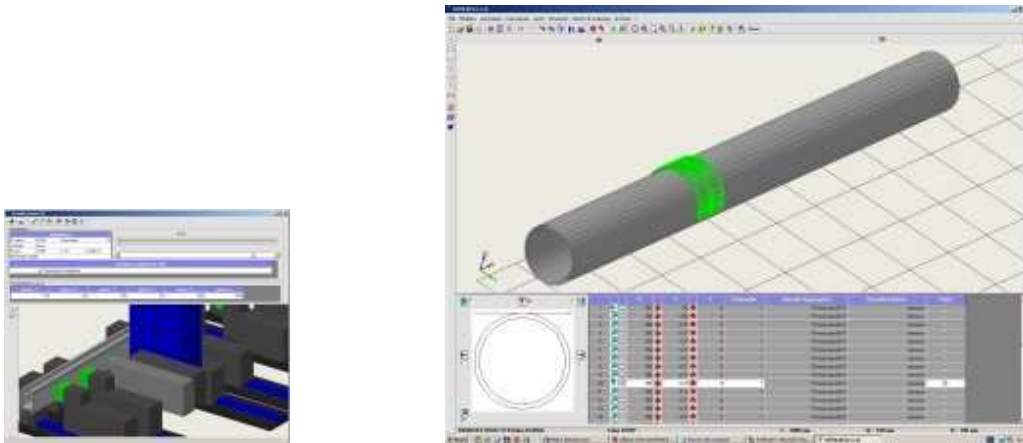
### **High-efficiency double cell machinings**

Save even more time and avoid production still-stands using the FomCam double cell machining functions. These functions allow to position the vises 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 vise setups with multiple components.

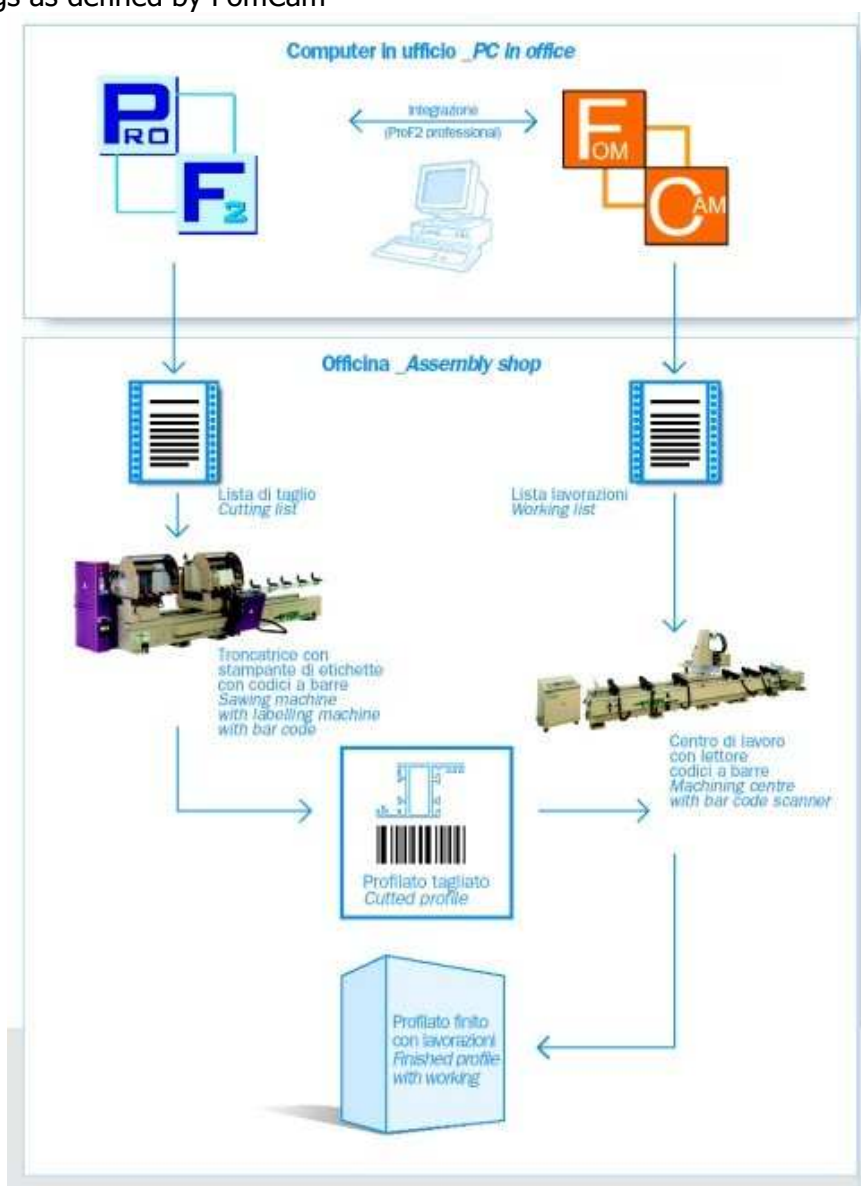


## Machining time calculation

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.

## 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

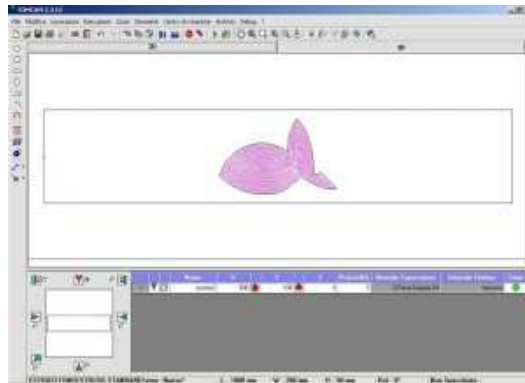


## FOMCAM - OPTIONAL MODULES

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

### 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.



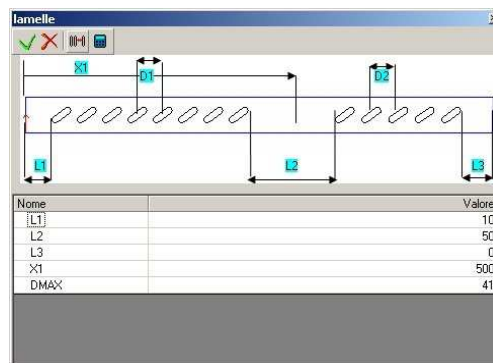
### Bar code reader

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.



### 3.0 TURNKEY SYSTEM

FOM INDUSTRIE not only offers its Clients a machine tool, but also a "turnkey" productive system to solve all of the problems involved in production. The company's experience is at the client's disposition to optimize the relationship between machining centre performance and the technological machining requirements .

A CAD-CAM system for creating a project which provides for piece design, automatic creation of the program and simulation of the machining operations

A vast archive of projects created for companies operating in important industrial sectors (automotive, railways, naval, furniture, transport, aeronautic, textile).

Facilitated contacts with the most important and qualified suppliers of tools and equipment

### 4.0 DOCUMENTATION

The machining centre comes with a printed copy of the following documentation:

- User and maintenance manual, complete with electric and pneumatic diagrams.
- Control unit user's manual.

<b>TECHNICAL SPECIFICATIONS</b>	<b>FLEN</b>
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Axes travel		
X Axis - longitudinal travel	mm	7.030
Y Axis - transversal travel	mm	940
Z Axis - vertical travel	mm	625
A Axis - electrospindle rotation		-15°/195°

Work capacity				
X Axis	longitudinal travel	mm	6.830	
Y Axis	transversal travel with electrospindle	90°	mm	500
		90°/180	mm	500
		0°/90°	mm	390
		0°/180°	mm	390
Z Axis	vertical travel with electrospindle	90°	mm	300
		90°/180	mm	250
		0°/90°	mm	250
		0°/180°	mm	250

Axis movement			
X axis	Rapid traverse	m/1'	100
	Acceleration	m/s <sup>2</sup>	2,5
Y axis	Rapid traverse	m/1'	60
	Acceleration	m/s <sup>2</sup>	3
Z axis	Rapid traverse	m/1'	60
	Acceleration	m/s <sup>2</sup>	3
A Axis	Speed		180°/sec

Machine accuracy		
Positioning accuracy		± 0,13
Repeatability accuracy		± 0,07

Electrospindle		
Cone		ISO 30 DIN 69871
Power 4 Kw	Max. torque	Nm
	Max. rotation speed	rpm

Tool magazine		
Tool replacement time	sec.	8
Number of tools	N°	12
Maximum tool weight	Kg.	6
Maximum tool length	mm	124
Maximum tool diameter	mm	220

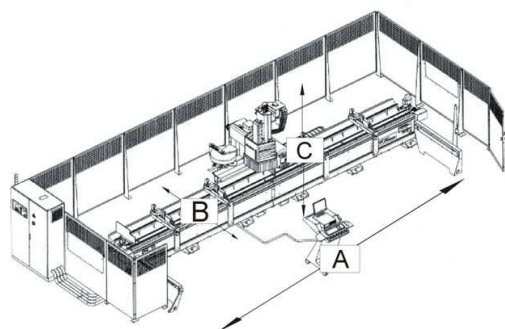
<b>TECHNICAL SPECIFICATIONS</b>	<b>FLEN</b>
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<b>Numeric control</b>		
Type		VISION

<b>Technical data for installation</b>		
Total installed power	Kw	10
Air consumption – cone cleaning	NI/min	27
Air consumption per cycle	NI	44,5
Continuous air consumption - electrospindle cooling	NI / min	200
Connection voltage	V	380/460
Connection frequency	Hz	50/60
Working pressure	atm	7

<b>Dimensions</b>		
Length	mm	8.500
Width	mm	1.770
Height	mm	2.840
Weight	Kg	4.380

Overall dimensions (machine without protection):



A (mm)	B (mm)	C (mm)	Kg
8500	1770	2840	4380

**STANDARD ACCESSORIES:**

Description
Electrospindle FOM 4Kw 12.000 rpm (ISO 30)
12-position tool magazine (ISO 30) Note: possible housing of single/double tool angular unit and blade-holder cone
No. 4 pneumatic vices with NC positioning and pneumatic locking
LH Sliding pneumatic stop
Chip conveyor belt.
Full soundproof cover of the machining head
Photocell barrier kit
Set up for the installation of fumes
Rear and side fences and swinging gate
Machine handling kit
Electronic equipment "Vision Plus"
PC+monitor+Operating System in English
Control Console
Software licence for FOMCAM program

**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)	ZG-79246
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)	ZG-79155

**OPTIONALS:  
ELECTROSPINDLE**

Description	Code
Surcharge for FOM 4KW 17.000 r.p.m. electrospindle (ISO 30)	PR-26944
Surcharge for FOM 4KW 12.000 r.p.m. electrospindle (HSK 40)	PR-26912
Surcharge for FOM 4KW 17.000 r.p.m. electrospindle (HSK 40)	PR-26945

**TOOL MAGAZINE:**

Description	Code
Surcharge for 20-position tool magazine (ISO 30) Note Housing of single-/double- tool angular unit and blade-holder cone not possible	PR-26808
Surcharge for 20-position tool magazine. (HSK 40) Note Housing of single-/double- tool angular unit and blade-holder cone not possible.	PR-26809

**OPTIONALS:**

Description	Code
Additional clamps (nr.2) Note: 6 additional clamps max quantity.	PR-26810
Y-axis extension kit (120 mm. stroke)	PR-26825
Dual station Note: At least no.2 additional clamps are required	PR-26811
Dual station Note: At least no.2 additional clamps are required (Only for Version CZ)	PR-26813
Dual station on four areas Note: At least no.4 additional clamps are required	PR-27262
Dual station on four areas Note: At least no.4 additional clamps are required (Only for Version CZ)	PR-27263
Forced lubrication for guideways movement	PR-26815
Micro-drop pure oil blade lubrication system	PR-26816
Micro-drop pure oil blade lubrication system for angular unit	PR-26817
Cooling system by emulsified oil with coolant recovery.	PR-26818
Flowdril kit Note: Lubricating oil not included.	PR-26819
Coppia di aspiratori versione Losma (Per Versione XX-11270 FLEN CZ) Nota: Consigliati minimo due per ogni isola N° 2 Fume Exhausters mod. Losma ) (for XX-11270 FLEN CZ) Nota: at least No. 2 for each working area	PR-26409
Machine handling kit for container	PR-25636
Machine handling kit Note: compulsory with article XX-11270FLEN CZ	PR-26462
Software licence for office FOMCAM program	ZP-26866
Additional FOMCAM licence for office (see pag.9) NOTE: Only with ZP-26866	ZP-26868
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 datas for CNC by means of FOM protocol for FOMCAM	ZB710214
Kit for the importation of datas for CNC by means of a non FOM's protocol	ZB710238
Kit for tele-service with analogue line. Note: it includes modem and PC-anywhere	PR-26264
Remote control for axes movement	ZD-75642
Bar-code optical reader and relevant software for the management of the working lists with module for data importation for CNC by means of Fom protocol for FOMCAM (ZB710214)	PR-26895
Bar-code optical reader and relevant software for the management of the working lists with module for data importation for CNC by means of a non-Fom's protocol per FOMCAM (ZB710238)	PR-27042
Wireless bar-code optical reader and relevant software for the management of the working lists with module for data importation for CNC by means of FOM protocol for FOMCAM. (ZB710214)	PR-27302
Wireless bar-code optical reader and relevant software for the management of the working lists with module for data importation for CNC by means of non-Fom's protocol for FOMCAM. (ZB710238)	PR-27303
Software licence for "Clock", module for times calculation for FOMCAM.	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



