

FMC Serie due

CNC Machining centre with 4 controlled axes



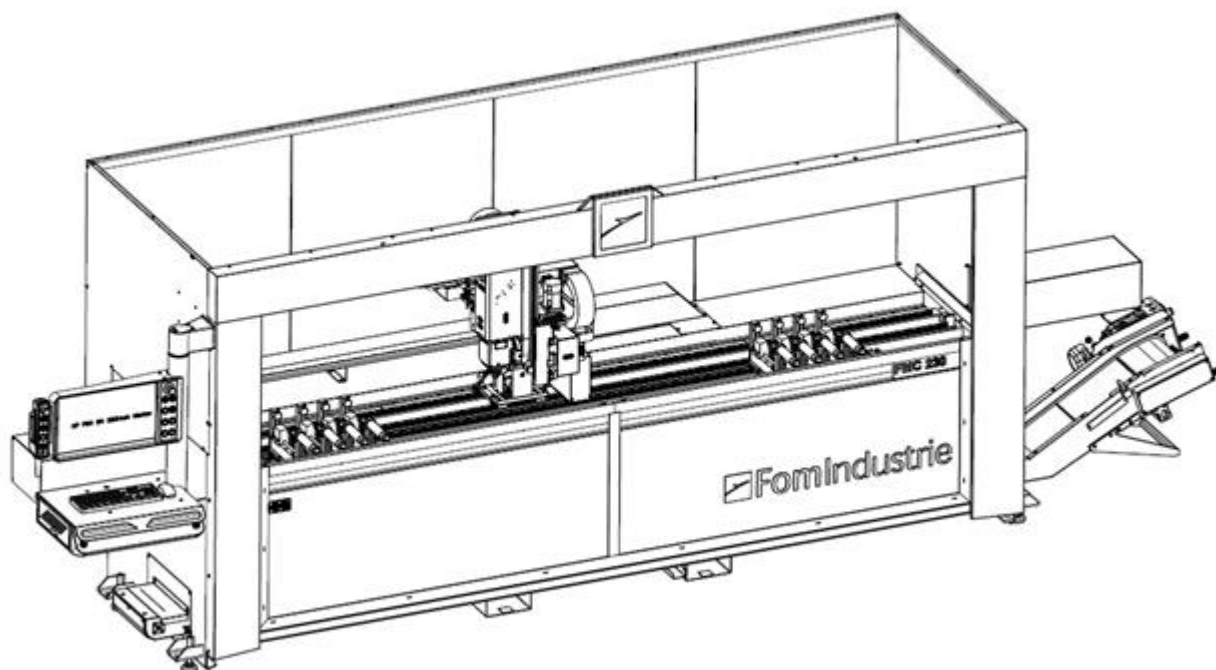
The FMC 230 machining centre with 4 controlled axes has been designed to carry out drilling and milling operations on aluminium or steel profiles (max. thickness 2 mm). Standard 10 location automatic tool change. The following functions can be activated on request: "machining of oversized profiles", "Flowdrill", "2 piece machining" and "Machining with X-PAL".

Standard configuration:

- Electrospindle 5 kW, 20.000 rpm (ISO 30)
- 10 location tool magazine on Left of machine base
- No. 2 pairs of pneumatic vices with positioning through the travelling column
- Left retractable fixed pneumatic stop
- Minimum quantity lubrication (MQL) with pure oil
- Manual greasing device
- Chip and waste collection tank in base
- Perimeter guard system. Retractable front door with automatic opening.
- Control equipment: POWER-I
- Movable control console
- Handheld control unit
- 24" Display
- Licence for FST CAM 4 program
- FST CAM 4 collective training course conducted online
- Potentially Industry 4.0 subsidizable asset
- Asset eligible under Transition 5.0



Overall dimensions and weight



Version	Length (L) mm	Width (W) mm	Height (H) mm	Kg
FMC 230	5580	1900	2300	1900
FMC 230	6440 (with conveyor belt)	1900	2300	2400

Consumption and absorption

Power supply	3F - 400 V - 50 Hz
Total power installed	11 kW
Air consumption for work cycle	150 NL/min
Working pressure	7 bar

Technical characteristics

Structure

The structure consists of a base and a travelling column sized to guarantee exceptional stability and precision during machining. The configuration of the base minimises the deposit of machining residues. On request, a chip conveyor can be installed in the base.

Axes movement

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

- Pinion with helical teeth and rack for axis X (longitudinal) and axis Y (transversal)
- High precision ground recirculating ball screw and preloaded lead nut for axis Z (vertical)

Absolute encoder systems applied to all the axes make the zeroing (homing) operation at machine start-up superfluous.

Centralised automatic lubrication system (on request)

A system automatically sends lubricant to the sliding and movement elements at preset intervals without stopping the machine. The parts lubricated in particular are:

Axis X: 4 slides of the linear guides and rack.

Y axis: 4 slides of the linear guides and rack.

Z axis: 4 slides of the linear guides recirculating ball screw nut

A message displayed on the monitor informs the operator when the minimum level of lubricant has been reached in the tank.

A device is also supplied as standard to carry out manual greasing when necessary.



Machining head

The machining head allows machining operations to be carried out on 3 faces of the profile and on 2 ends. The tilting axis consists of a rotating head of high-precision and rigidity driven by a zero play gear drive and brushless motor.



Electrospindle

The 5 kW air-cooled electrospindle provides power and reliability under all operating conditions. The rigid tapping function can be activated on request.

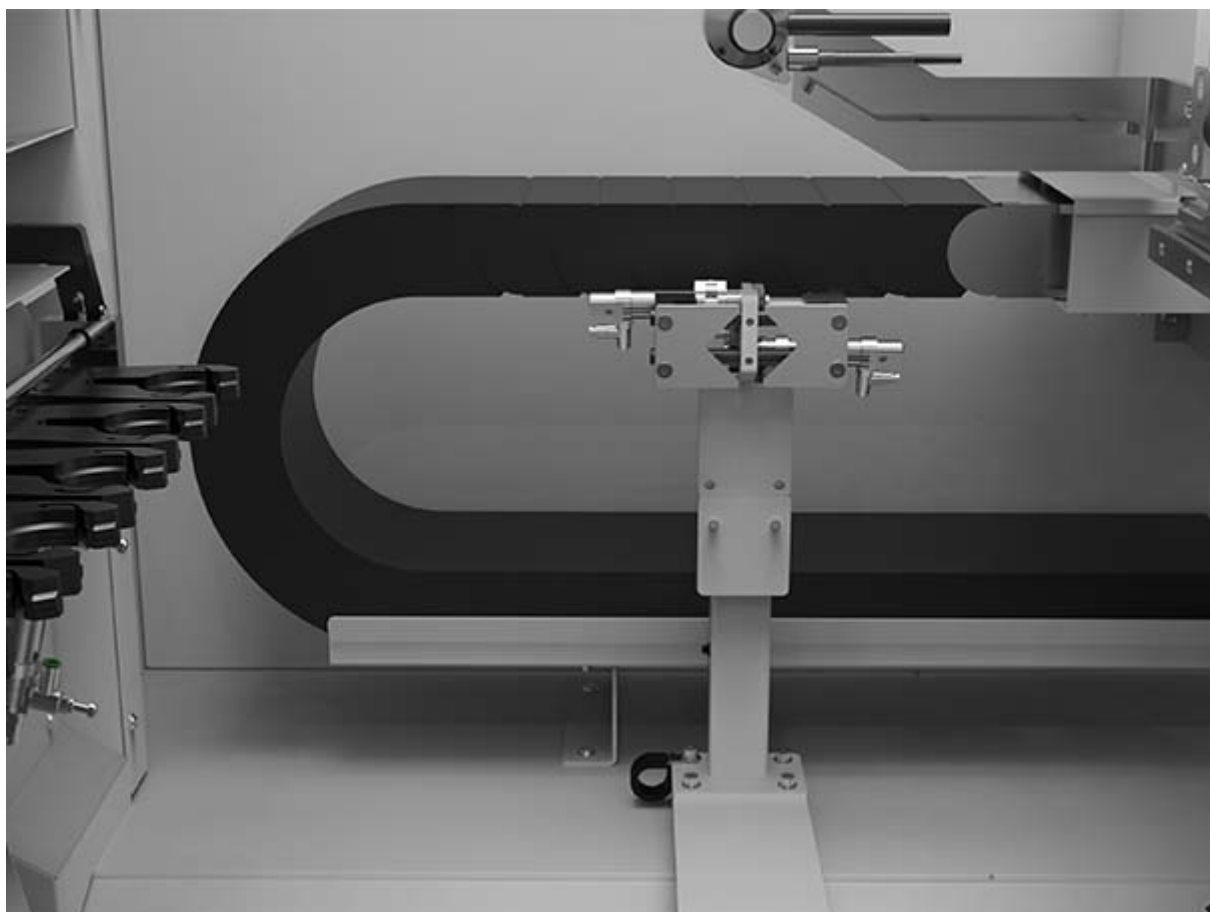
	5 kW electrospindle
Rigid tapping on aluminium	Max M10
Rigid tapping on steel	Max M8

Tools lubrication

The tools are lubricated by a pressure spray (minimum quantity lubrication). The lubricant used is pure oil or, on request, oil emulsion and a dedicated tank (Lubrocooling with minimum use of water-oil emulsion).

X FLOW - FOM PATENT (on request)

Used to adjust and optimise the lubricant flow direction automatically during tool change operations without manual intervention by the operator.



DRY MACHINING (on request)

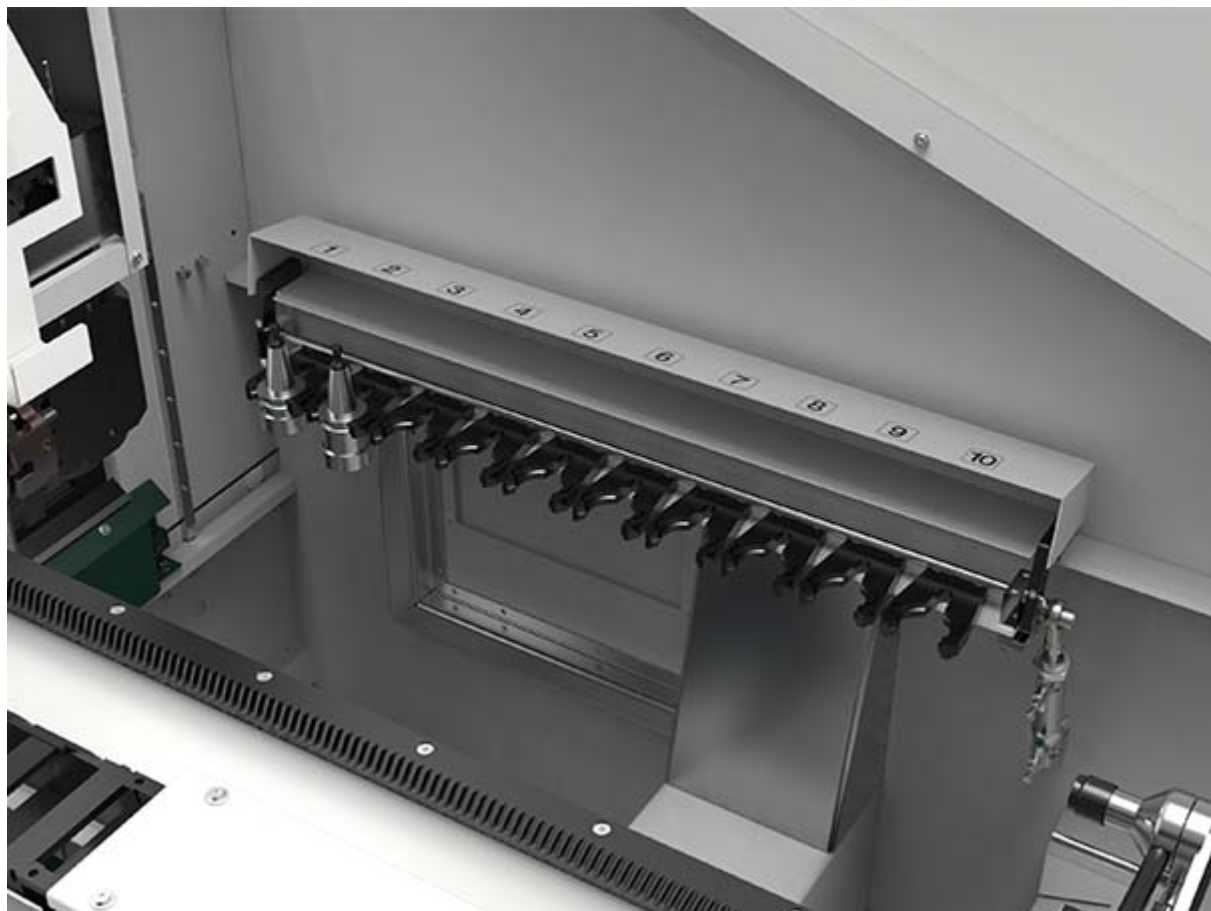
Tool cooling system with localised flow of cold air associated with the choice of dedicated tools. It allows machining without the use of lubrication, achieving excellent finishes at high speeds. The advantages of dry machining can be summarised as follows:

- elimination of the workpiece drying and cleaning phases
- cleaning of the working area
- no waste fluid disposal costs
- no fume extraction system costs
- quieter machining operations
- longer tool life



Tool magazine

The tool magazine is positioned to the left of the machine bed and has 10 locations.



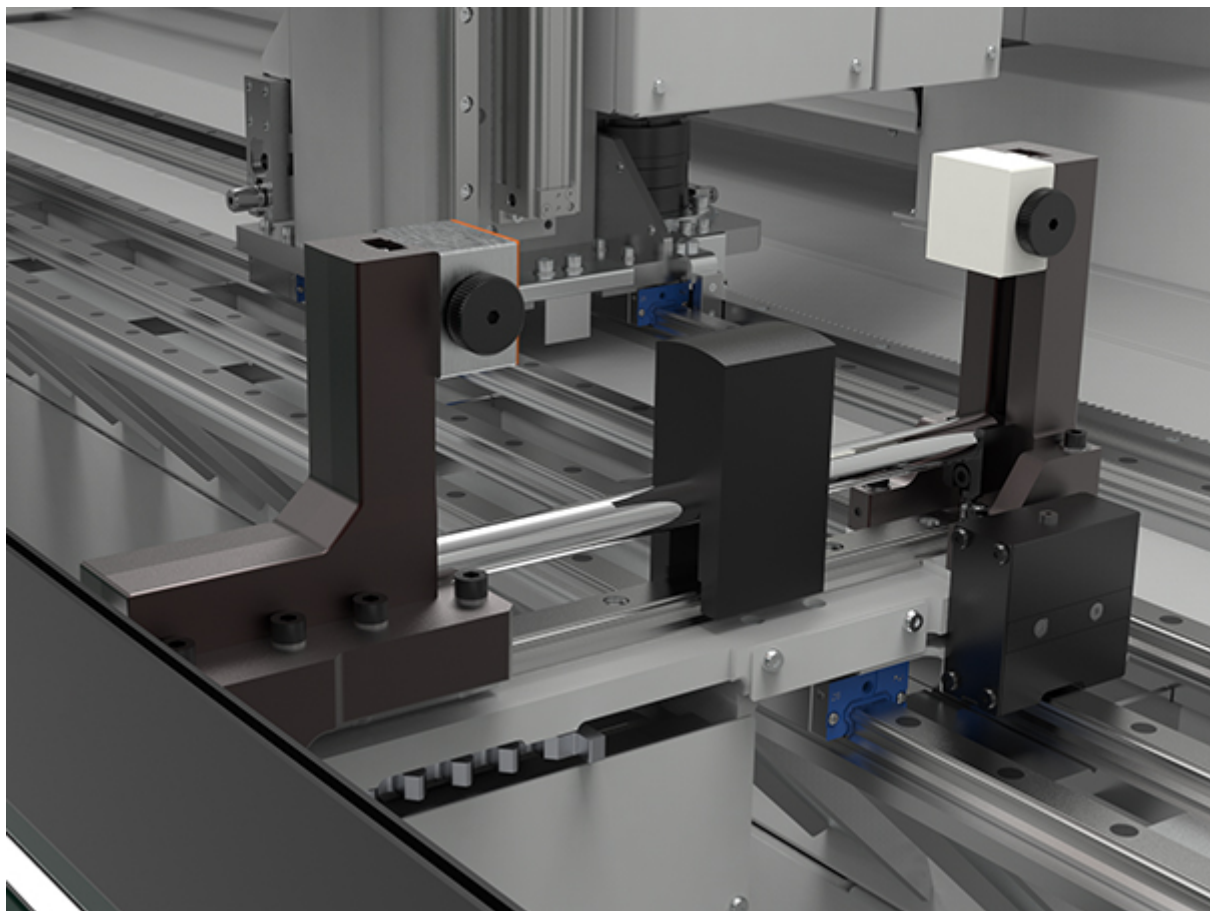
Work area organisation

Vices

Made of aluminium and steel. They slide along the axis X on straight guides. Their small size reduces the need to reposition the vices and ensures firm locking very close to the machining point. Automatic positioning (using the machining head) is supplied as standard. Vertical and transversal adjustment of the presser is quick and does not require the use of tools.



Cast iron EXTRA CLAMPING VICES are also available on request, in which closing of the jaw is carried out using straight guides. Each vice has a centre roller to facilitate loading the profiles and prevent chip deposit. Automatic positioning (using the machining head) is supplied as standard. The position of the jaw and the vice pad can be adjusted quickly without the use of tools. The jaw is adjustable in Y to set positions, while the vice pad is adjustable in Z to any position, to ensure ideal clamping in every working condition. Each extra clamping vice is fitted with lowered pads that allow the clamping capacity and working areas to be extended.



Stops

A retractable stop is provided in a fixed position on the left side. On request, a second stop can be provided on the right side, which is also useful for two-phase machining of profiles that are longer than the CNC stroke.



Device to measure profile length (on request)

Located on board the axis X. The machining positions are updated automatically after measurement.

X PAL - FOM PATENT (on request)

Multifunction LED bar that assists the operator when using the machine and loading the bars. Allows additional positioning with respect to that provided by the stops. Signals the progress of the machining cycle.

**Possible work area configurations:**

The following working modes are possible depending on the selection of vices, stops or X PAL:

FMC 230

- SINGLE WORKING AREA 1 PIECE
- SINGLE WORKING AREA 2 PIECES
- SINGLE WORKING AREA 2 PIECES AND OVERSIZED MACHINING
- SINGLE WORKING AREA WITH X PAL

Protection and safety devices

The CNC machining centre bears the CE symbol in compliance with the content of Directive 2006/42/CE (Machine Directive). The design and construction of the machining centre complies with the safety regulations in force in the European Union and in the main industrialised countries (USA, Canada, etc). In particular, for the European Union market the following legal provisions are complied with: Directive 2006/42/CE (Machine Directive), Directive 2014/30/UE (EMC). The machining centre is also equipped with special safety devices designed to comply with the relevant product standards and the regulations on health and safety in the workplace:

Perimeter guard system around the machine with mobile door ensuring maximum visibility during machining operations and accessibility during maintenance.

Luminous status bar (Fom Industrie Logo) incorporated in the guard system, the colour of which signals the machine status.

Stopped shaft safety module that enables the doors to be opened under safe conditions.

Safety PLC.

The electrical system has been engineered in compliance with the provisions contained in European Union directives 2006/95/CE (LVD), 2004/108/CE (EMC) and conforming to the applicable standards governing the safety of electrical systems (EN 60204-1, EN 61000-6-2 and EN 61000-6-4). Special care has been given to the provision of emergency cables and to the system for activating and resetting them. If any faults occur, the operator is alerted by light signals and messages on the monitor. In the event of faults or breakdown, The protection devices inside the panel are designed to prevent injury to persons and/or damage to the machining centre itself.

If for any reason the interaction between the CNC machining centre and the environment in which it is installed contravenes any of the above mentioned conditions, it will be essential to agree with the purchaser a comprehensive solution for achieving the necessary safety conditions so that the purchaser can make the area designated for installing the machining centre suitable and safe.



Control console

Attached to the protection cabin and used to execute commands and run programs. 24" display

Handheld control unit

Standard and ergonomic, allows the machine to be controlled from any position during machining.

PC comprising of:

128 GB SSD
Gigabit RJ45 network Interface
8 GB RAM
Windows 10 operative system
USB ports

LOLA

LOLA is the cloud-based IoT service platform developed by Fom Industrie to monitor and optimize the productivity, efficiency, and energy consumption of machine tools, in line with the requirements of Industry 5.0.



Main features

Productivity and efficiency monitor:

Provides a clear view of machine performance, enabling the identification of areas for improvement and optimization of production processes.

Diagnostics and maintenance service:

Continuous monitoring of sensors and critical components, such as spindles and tools, to ensure timely maintenance and reduce machine downtime.

Energy consumption monitoring:

Allows, through the installation of dedicated sensors on the machine, to monitor and analyze consumption over time, promoting more sustainable operations and reducing operating costs.

Technical features:

Multi-device accessibility:

The platform is accessible via browser (Safari, Chrome) on PCs or mobile devices, with a responsive layout adapted to all screen types.

Centralized management:

Aggregated view of machines and alarms by plant or department, with user and access level management based on hierarchical criteria.

Maintenance notifications:

Real-time notifications of alarms and maintenance interventions, with a constantly updated log of performed interventions. Usage counters for key components also facilitate scheduling of replacement interventions, minimizing machine downtime.

Multilingual:

Available in Italian, English, French, Spanish, and German.

The LOLA service platform thus offers a comprehensive overview of machine status, with production statistics, diagnostics of key components, alarm management, and energy monitoring, ensuring maximum



operational and production efficiency.

FST CAM 4 graphic interface

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:

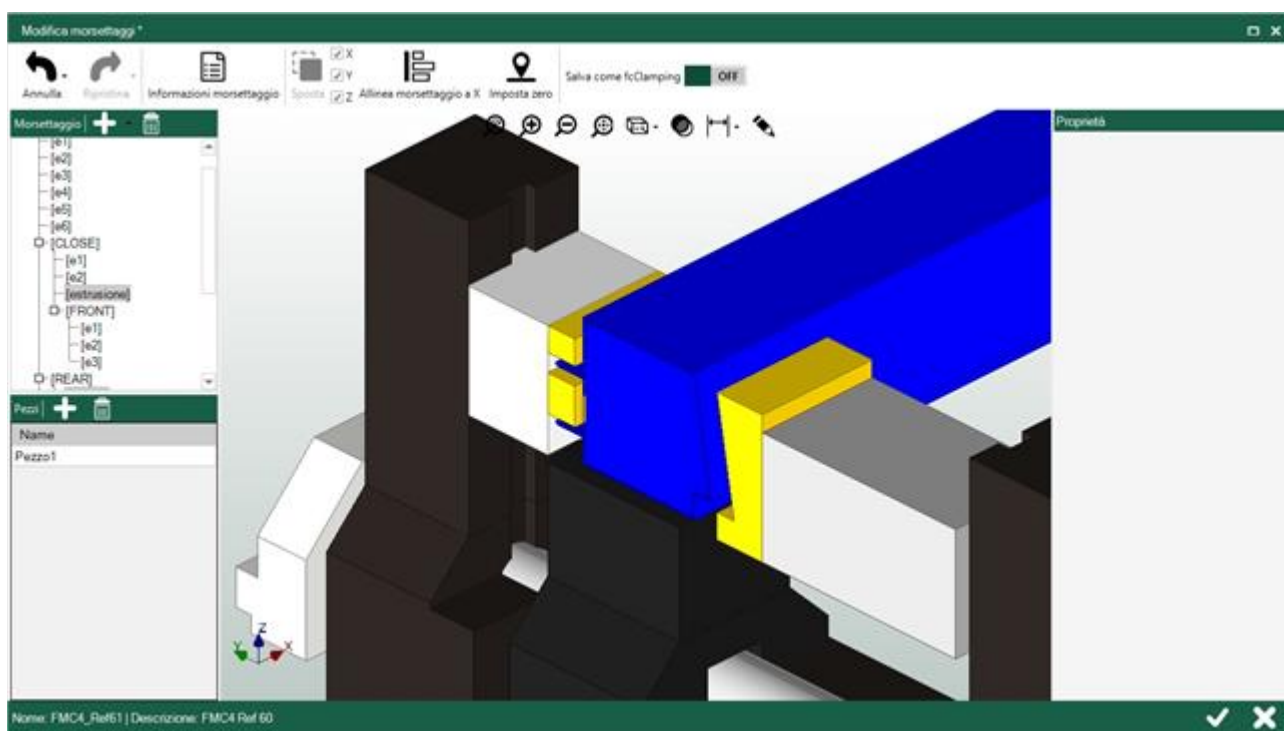
Display of the workpiece and machining operations in a CAD 3D environment
Profile cross-section display in DXF format
3D display of tool archive
Machining optimizations
Dynamic display of the machining operations
Graphic display of the working area
Simplified management of machining process sequence
Display of technical features of pieces and tools
Graphic user interface
Parametric machining management
Creation of repeated machining operations
Automatic calculation of optimal vice positioning
Machining lists management
Graphic interface for numeric control management

Optionals:

Licence for FST CAM 4 program for office
Additional licence for FST CAM 4 program for office
"Clock" time calculation module program user license for FST CAM 4
FSTCAM4 module to design and manage special clamping operations (PIC. 3)
2D custom milling Module for FST CAM 4
3D custom milling Module for FST CAM 4
SOLID PLUS software licence (3+1 or 4 axis CNC machining centres)
SOLID PLUS additional software licence (3+1 or 4 axis CNC machining centres)
Licence for FST STATISTICS C4 program
SW licence FSTConverter for data import in NCX format
Module for rigid tapping and chase tapping
Flow drilling management
Data import software in accordance to FOM protocol + Wireless optical bar code and QR code reader
Data conversion driver
FSTCAM4 Material removal software module



PIC. 3



Remote Assistance

Used to check the machine data, the user programmes, the input/output signals and system variables in real time, providing a rapid solution to problems and a drastic reduction in machine stoppage. Thanks to remote assistance it is also possible to install updated software versions. The machining centre is enabled for this type of service. The duration of the service is limited to the machining centre warranty period.

Maintenance equipment

The following are supplied with the machining centre:

Tool holder locking device for insertion/removal of tools

Set of wrenches

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 optimise the relationship between machining centre performance and the technological machining requirements, the service relies on:

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

Documentation

Every 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. The manuals are available in Italian and English



Technical specifications:

Working area with direct tool L=100 spindle end			
Axis X	top face only	mm	3280
Axis X	top face + ends	mm	3200
Axes Y and Z	for machining on 3 faces of profile	mm	160 x 210
Axes Y and Z	for machining on 2 faces of profile	mm	190 x 210
Axes Y and Z	for machining on 2 faces of profile with extra clamping vices	mm	250 x 210
Axis A			-15° ÷ +195°

Dynamic performance			
Axis X	Speed	m/min	90
Axis Y	Speed	m/min	70
Axis Z	Speed	m/min	30
Axis A	Speed	°/min	10800
Axes X	Acceleration	m/s ²	2
Axis Y	Acceleration	m/s ²	3
Axis Z	Acceleration	m/s ²	1

Profile positioning and locking			
Vices with automatic positioning along the X-axis (longitudinal) through the travelling column		n.	4 as standard
Max number of vices		n.	8
Fixed position retractable stop		n.	1 standard + 1 optional
SW adjustment of the vice pressure			optional
Transformation of standard vices into extra clamping vices			optional
Lowered pads on extra clamping vices			standard
Oversized profile machining + guard tunnel *			optional
Device to measure profile length			optional
X PAL	FOM PATENT		optional

*In some working situations it may be necessary to restrict the number of tools housed.

Electrospindle			
5 kW 20.000 rpm electrospindle			standard
SW Module for rigid tapping			optional
Cooling			Air
Tool coupling			ISO 30

Lubrication of mechanical components

Centralised automatic lubrication system		optional
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Tool magazine

10-Position tool magazine fixed to the base		standard
Maximum blade diameter in the magazine (horizontal)	mm 150	
Maximum tool length in the magazine	mm 150	
Device to measure tool length		optional

Tool lubrication

Minimum quantity lubrication		standard
Lubrocooling with minimum use of water-oil + dedicated tank		optional
X FLOW automatic orientation of lubrication nozzles	FOM PATENT	optional
Additional Flowdrill lubrication system		optional

Chips, waste and fumes removal

Chip and waste collection in base		standard
Hinged belt conveyor with ramp		optional
Integral guard system (top side)		optional
Rear chip collection tanks		optional

Control and software

Wired push button strip	standard
Processor	Intel i7
24" screen	standard
Luminous FOM logo indicating the machine status	standard
USB ports	1 console + 2 in the PC
SSD	128 GB
Memory	8 GB
Wireless bar-code reader	optional
Software	Windows 10 - FST CAM 4
Lola ready	standard



Possible work area configurations (on request):

SINGLE WORKING AREA 2 PIECES

- Right pneumatic fixed stop

SINGLE WORKING AREA 2 PIECES AND OVERSIZED PROFILES MACHINING:

- Right pneumatic fixed stop
- Tunnel for oversized profile machining
- SW to manage oversized machining operations

SINGLE WORKING AREA WITH X PAL:

- LED bar
- SW for profile positioning
- SW to view machining cycle progress
- Device to measure profile length
- "Clock" time calculation module program user license
- Right pneumatic fixed stop

SINGLE WORKING AREA 2 PIECES MACHINING WITH X PAL:

- LED bar
- SW for profile positioning
- SW to view machining cycle progress
- Device to measure profile length
- "Clock" time calculation module program user license
- Right pneumatic fixed stop
- Tunnel for oversized profile machining
- SW to manage oversized machining operations



Optionals:

- Voltage transformer 16 KVA (for voltages outside the range 380-440V 50/60 Hz, three phase)
- System compliant with UL-CSA standards
- Electric cabinet cooling
- DRY MACHINING

Tool cooling system with localised flow of cold air
(dedicated tools must be used)

- Tool set for dry machining:

N° 1 single cutting edge mill Ø 5

N° 1 single cutting edge mill Ø 6

N° 1 double cutting edge mill Ø 8

N° 1 double cutting edge mill Ø 10

N° 1 T-slot cutting edge Ø 48

N° 4 tool holder cone ER20 H50

N° 1 tool holder cone ER32 H50

N° 1 gripper Ø 4/5

N° 1 gripper Ø 5/6

N° 1 gripper Ø 7/8

N° 1 gripper Ø 9/10

N° 1 gripper Ø 13/14

- Compliance with EAC standards (Eurasian Conformity)
- Tool length measurement and tool breakage detection device
- X FLOW (Automatic orientation of lubrication nozzles)
- Pair of additional vices with positioning through the travelling column (max 2 pairs for FMC 230)
- SW adjustment of the vice pressure 3,5 - 7 bar
- Device to measure profile length
- Lubrocooling with minimum use of water-oil emulsion; Dedicated tank
- Additional Flowdrill lubrication system (steel flowdrilling, not suitable if the profiles are already galvanised)
- Hinged belt conveyor with ramp
- Rear chip collection tanks
- Integral guard system (top side) with internal lighting and set-up for fumes extractor
- Horizontal blade assembly cone; Ø 150 mm blade included
- Centralised automatic lubrication system
- Equipment for machine handling with bridge crane
- UPS (Uninterrupted Power Supply) to allow PC switch-off in the event of a blackout
- Software licence for LOLA
- TOOL SET ALUMINIUM TYPE 1:
 - N° 1 hole drill bit HSS single flute Ø 3 L=61 mm
 - N° 1 hole drill bit HSS single flute Ø 6/12 L=100 mm
 - N° 1 MD single flute milling cutter Ø 10 covered L=72 mm
 - N° 1 MD single flute milling cutter Ø 6 covered L=60 mm
 - N° 4 collet holder with ring nut ER 20 H=50 mm
 - N° 1 collet Ø 2/3 ER 20
 - N° 1 collet Ø 5/6 ER 20
 - N° 1 collet Ø 9/10 ER 20
 - N° 1 collet Ø 11/12 ER 20
- TOOL SET STEEL TYPE 1:
 - N° 1 MD single flute milling cutter Ø 6 L=56 mm
 - N° 1 MD single flute milling cutter Ø 8 L=67 mm
 - N° 2 collet holder with ring nut ER 20 H=50 mm
 - N° 1 collet Ø 5/6 ER 20



N° 1 collet Ø 7/8 ER 20

- ISO 30 L50 ER20 collet holder
- ISO 30 L75 ER20 collet holder
- ISO 30 L50 ER32 collet holder
- ISO 30 L67 ER32 collet holder
- 6000DPL Lubexall oil 5 l
- 6000DPL Lubexall oil 25 l
- Tank of oil for cooling system by emulsified oil (18,5 lt)
- Lubricating grease for guideways (5 Kg tank)
- Lubricating grease for guideways (1 Kg tank)

