

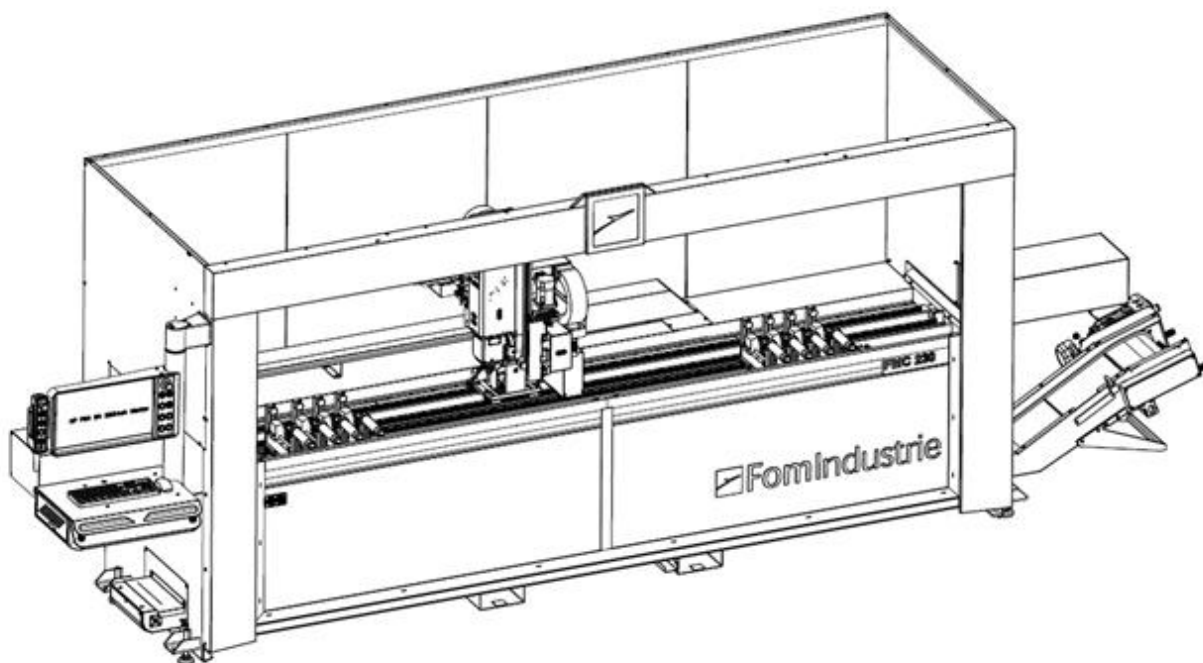
FMC SERIE DUE

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). The standard 10 location automatic tool change and tool-free vice jaws adjustment speed up the manufacturing process. The following functions can be activated on request: "machining of oversized profiles", "Flowdrill", "2 piece machining" and "Machining with X-PAL".

Overall dimensions and weight



Version	L (mm)	P (mm)	H (mm)	Kg
FMC 230	5580	1900	2300	1900
FMC 230	6680 (with conveyor belt)	1900	2300	2400
FMC 230 CZ	5580	1900	2300	2000
FMC 230 CZ	6680 (with conveyor belt)	1900	2300	2500

Power supply	Total power installed	Air consumption for work cycle	Working pressure
3F - 380÷415 V - 50 Hz	10,9 kW	150 NL/min	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:

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

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

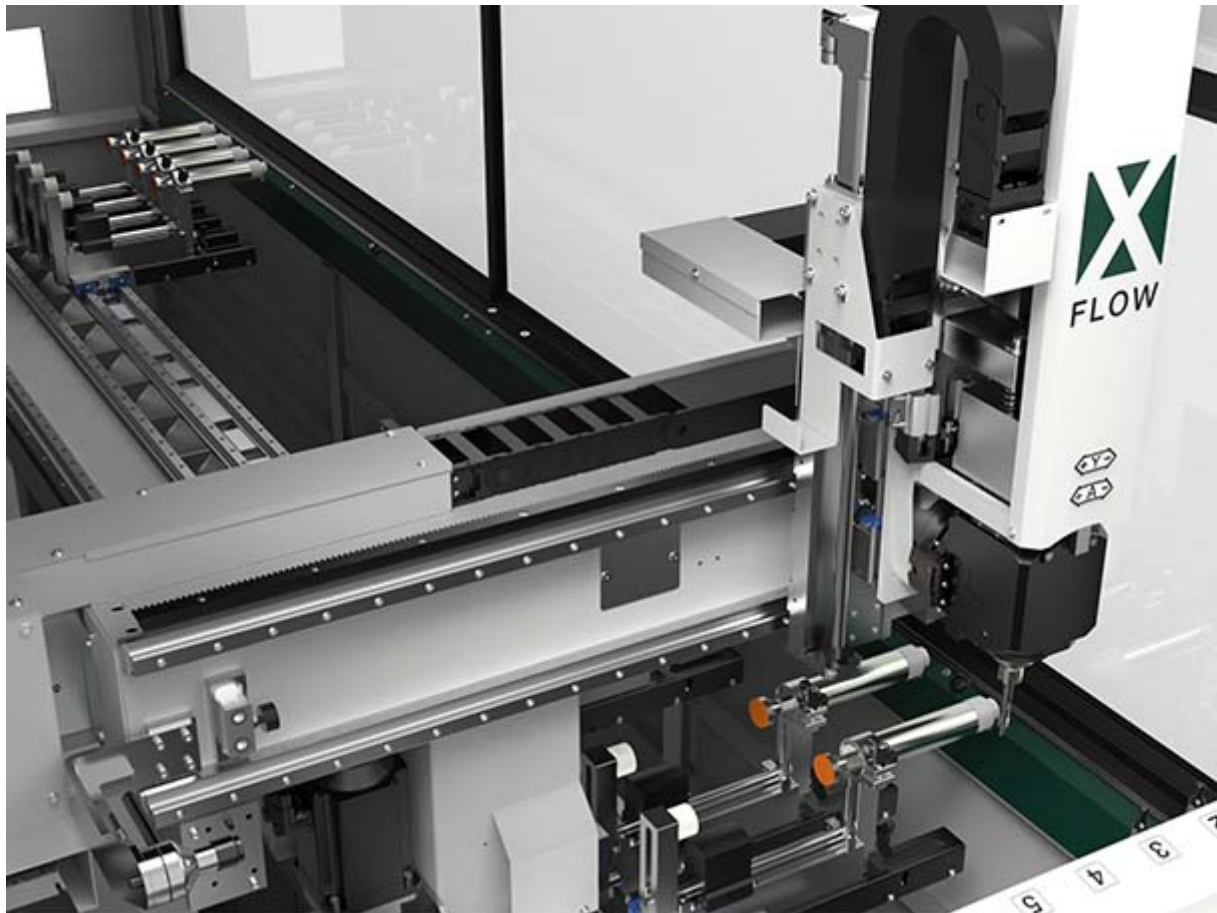
Z axis: 4 slides of the linear guides recirculating ball screw nut

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.

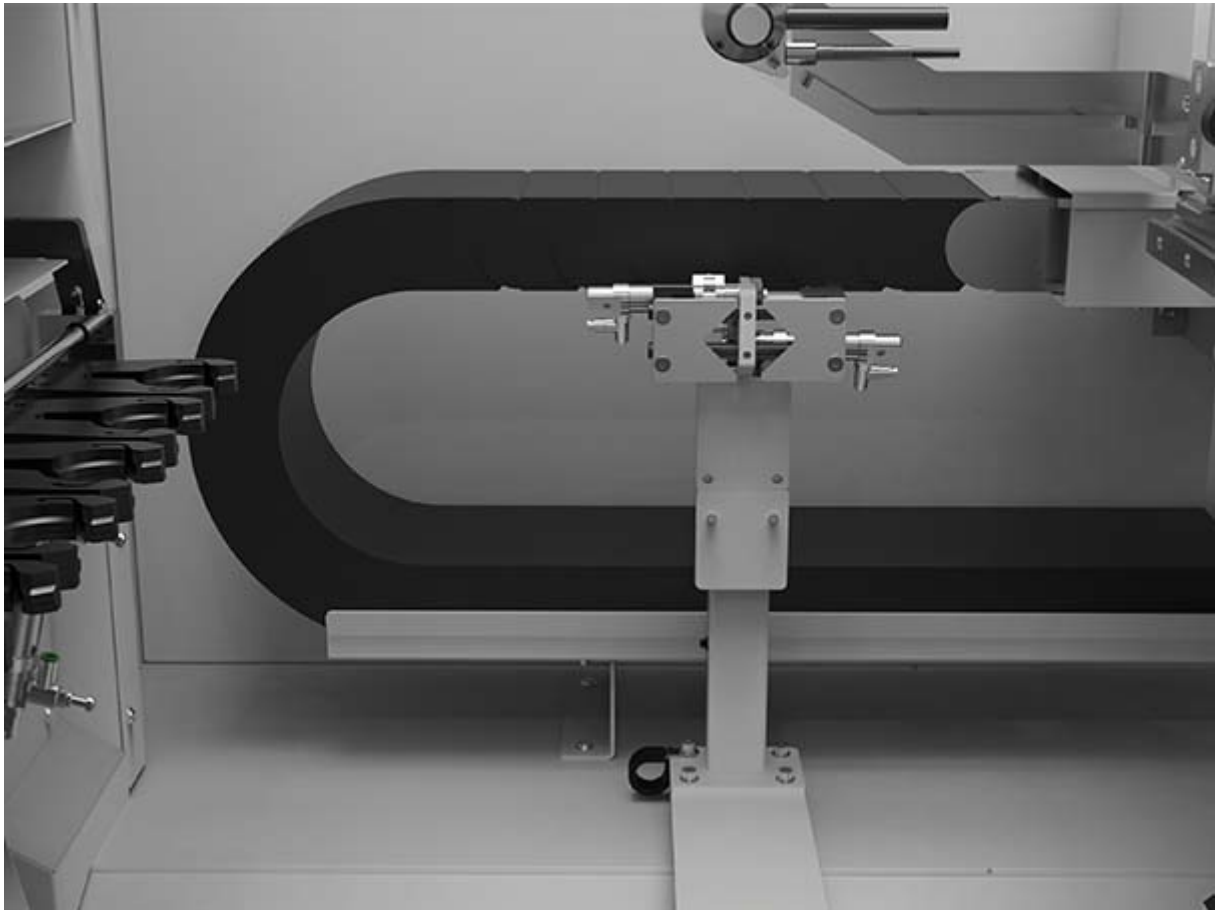
	5 kW electrospindle
Rigid tapping on aluminium	Max M10 depth 20 mm
Rigid tapping on steel	Max M10 depth 2 mm

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 (mist type cooling lubrication).

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.



Tool magazine

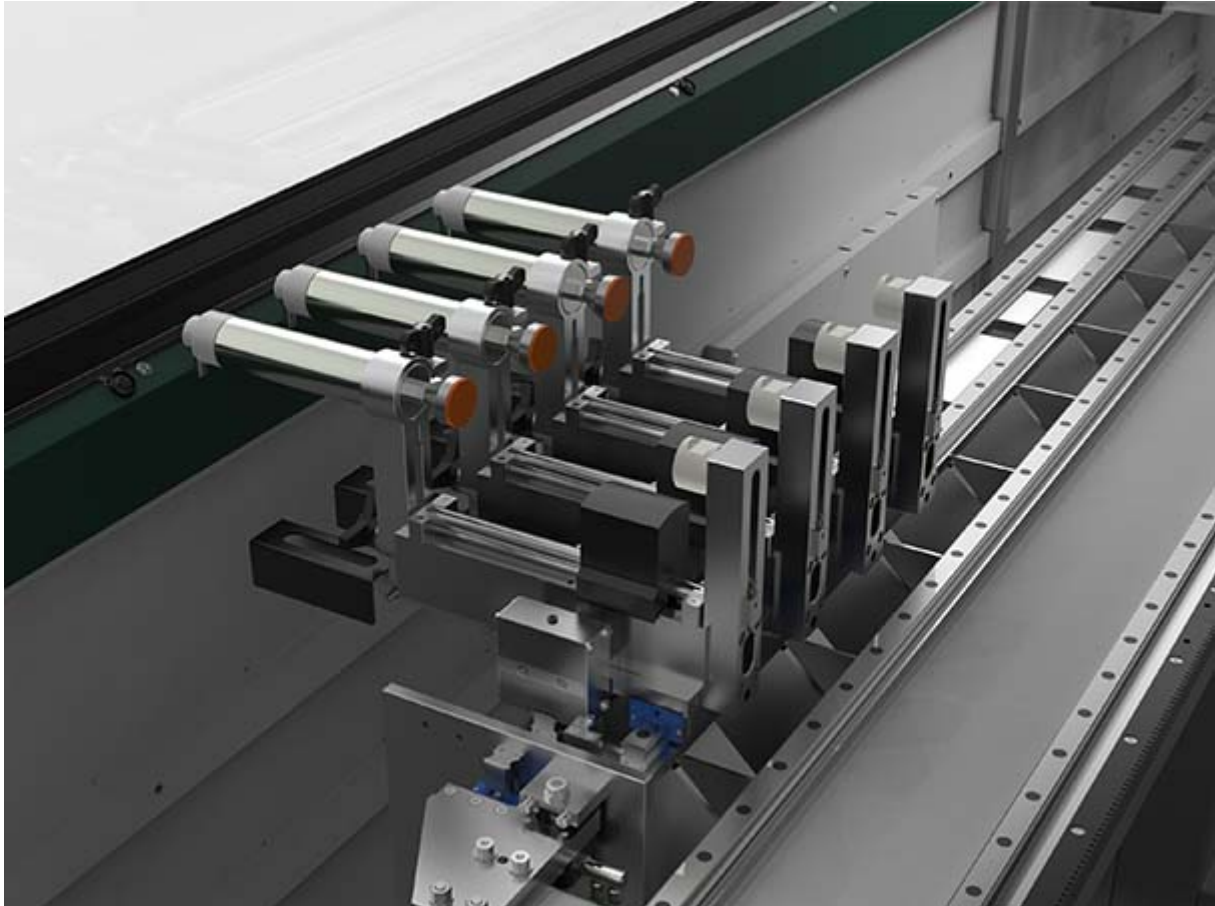
The tool magazine is positioned to the left of the machine bed and has 10 locations.



Work area organisation

Vices

Made of aluminium and steel. They slide along the X axis 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.



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.

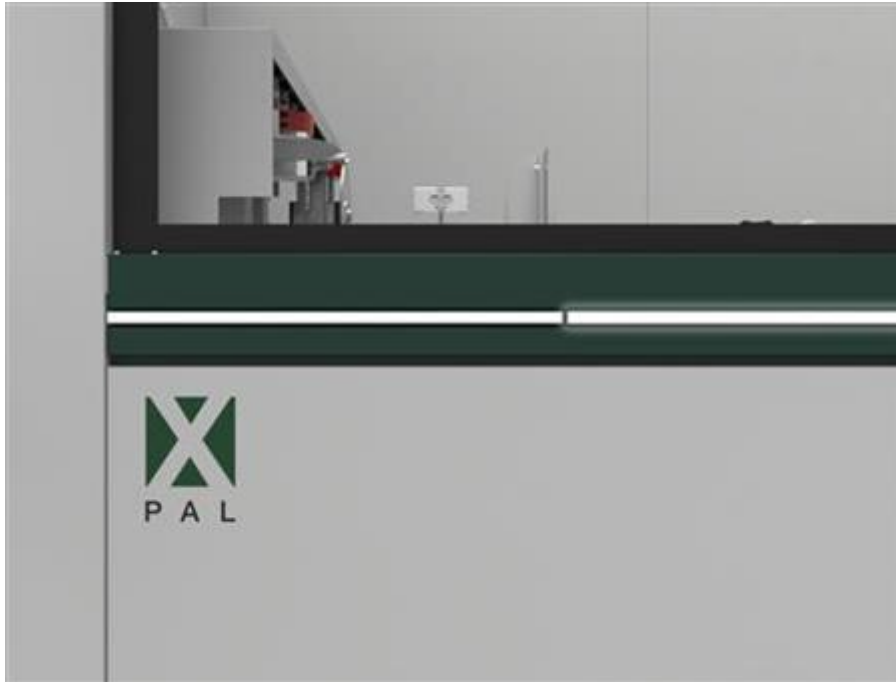


Device to measure profile length (on request)

Located on board the X axis. 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 safety casing 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

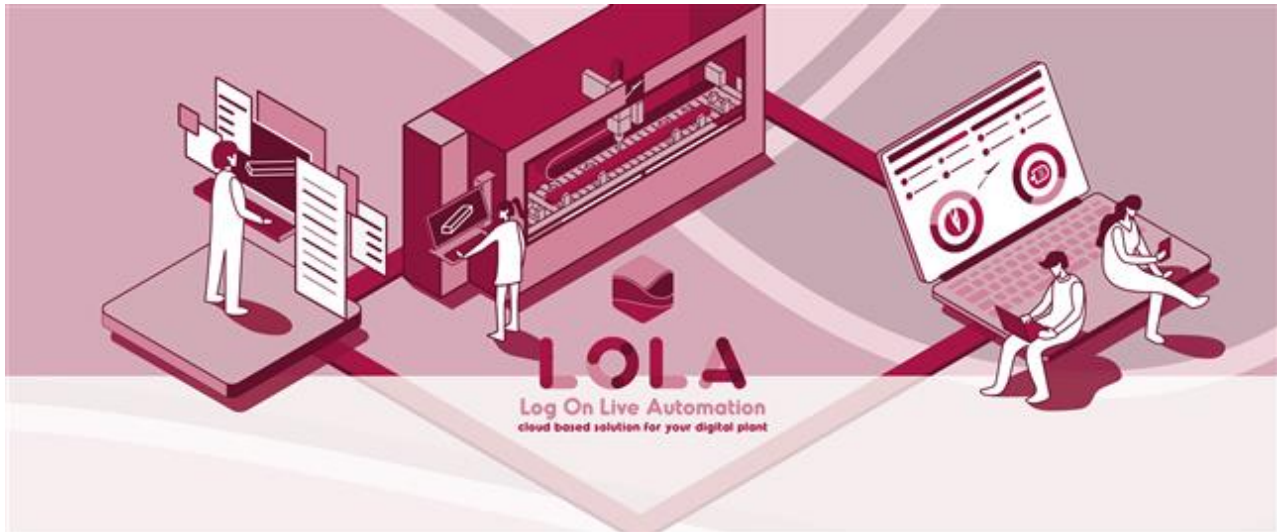
Control pushbutton panel

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
3-year international "on site" warranty

LOLA



LOLA is the cloud based IoT platform created by Fom Industrie for Industry 4.0, with the aim of monitoring and increasing productivity and efficiency.

The LOLA web application can be accessed via browser (Safari, Chrome), on a PC or mobile device.

LOLA receives data from the FOM Industrie machine tool, via internet connection, and generates statistics that can be consulted by the end user, regarding:

- productivity
- efficiency
- diagnostics
- scheduled, periodic and predictive maintenance
- alarms, push notifications and predictive warning

Characteristics

- Developed in responsive technology, which adapts the graphic layout to the device being used.
- Plant Manager for grouped display of your machines and alarms, based on factory or manufacturing department
- Timezone/DayTimeSavingLight Management
- LOLA application users (unlimited, until expiry of the license) with two privilege levels, to define criteria for hierarchical content visibility.
- Various machines can be associated with a single operator, or several operators can be associated with various machines.
- LOLA is now available in 5 languages: Italian, English, French, Spanish, German

LOLA allows control of the following with a single glance:

- machine status and efficiency
- machining statistics
- diagnostics for key machine components (e.g. electrospindles, tools, sensors..)
- alarms and warnings log for the individual machine or the factory (*for FOM LOLA compliant machines)
- push notifications for periodic and predictive maintenance events. Log of operations confirmed in LOLA.

The data indicate every time a key component is coming to the end of its lifecycle, so that it is possible to plan the replacement operation with the FOM service department or independently, thus minimising machine stoppages.

Export of data for integration with MES systems

With the additional Lola Exporter license it is possible to export the data collected by LOLA in CSV format locally, allowing subsequent integration with the most common MES systems

FST CAM 4 graphic interface

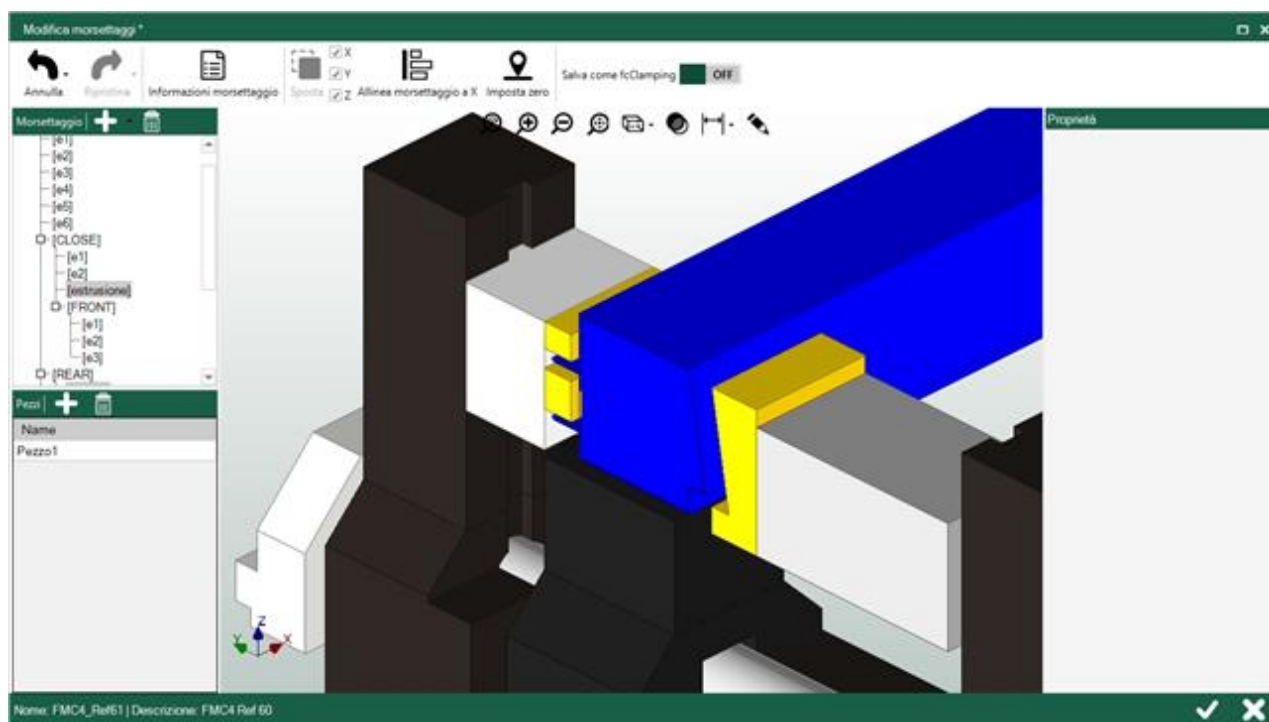
Graphic interface based on the Windows operating system for planning the machining operations and the pieces which automatically generates the CNC program that can be executed by the machining centre.



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
Module for rigid tapping and chase tapping (on request)
FSTCAM4 module to design and manage special clamping operations (on request, PIC. 3)
Flow drilling management (on request)
Module for insertion of "user defined" geometries by importing the shape of the machining operation from DXF format files, for FST CAM 4 (on request)
Wireless bar-code reader + data import software in accordance to FOM protocol (on request)

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

Standard configuration:

- Electrospindle 5 kW, 18.000 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
- Perimetral safety casing. Retractable front door with automatic opening.
- Control equipment: POWER-D
- Movable control console
- 24" Display
- Licence for FST CAM 4 program
- Collective FST CAM 4 training course at FOM Industrie (excluding transfer costs)

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
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
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 18.000 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)
- Additional charge for electrical version UL-CSA
- Additional charge for electric cabinet cooling
- Additional charge for EAC (Eurasian Conformity) certification
- Device to detect presence and check length of tool
- 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
- Full casing (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
- Wireless bar-code reader
- Data import software in accordance to FOM protocol
- Data conversion driver
- Rigid tapping
- Software licence for LOLA
- Licence for FST CAM 4 program for office
- Additional licence for FST CAM 4 program for office
- 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
- "Clock" time calculation module program user license for FST CAM 4
- 2D custom milling Module for FST CAM 4
- 3D custom milling Module for FST CAM 4
- Software licence for data import in NCX format
- TOOL SET ALUMINIUM TYPE 1:
 - N° 1 hole drill bit HSS single flute $\varnothing 3$ L=61 mm (HZ-76292)
 - N° 1 hole drill bit HSS single flute $\varnothing 6/12$ L=100 mm (HZ-45284)
 - N° 1 MD single flute milling cutter $\varnothing 10$ covered L=72 mm (HZ324188)
 - N° 1 MD single flute milling cutter $\varnothing 6$ covered L=60 mm (HZ324190)
 - N° 4 collet holder with ring nut ER 20 H=50 mm (DR205843)
 - N° 1 collet $\varnothing 2/3$ ER 20 (DR-75709)
 - N° 1 collet $\varnothing 5/6$ ER 20 (DR-75705)
 - N° 1 collet $\varnothing 9/10$ ER 20 (DR-75077)
 - N° 1 collet $\varnothing 11/12$ ER 20 (DR710560)
- TOOL SET IRON TYPE 1:
 - N° 1 MD single flute milling cutter $\varnothing 6$ L=56 mm (HZ311745)
 - N° 1 MD single flute milling cutter $\varnothing 8$ L=67 mm (HZ311746)
 - N° 2 collet holder with ring nut ER 20 H=50 mm (DR 205843)
 - N° 1 collet $\varnothing 5/6$ ER 20 (DR-75705)
 - N° 1 collet $\varnothing 7/8$ ER 20 (DR-75088)
- ISO 30 L50 ER20 collet holder
- ISO 30 L75 ER20 collet holder
- ISO 30 L50 ER32 collet holder
- ISO 30 L67 ER32 collet holder
- FMC Installation - Italy (excluding transfer costs)
- FMC Installation - Europe (excluding transfer costs)
- FMC Installation - Outside Europe (excluding transfer costs)
- 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)