Titan

A CNC Machining centre with 5 controlled axes

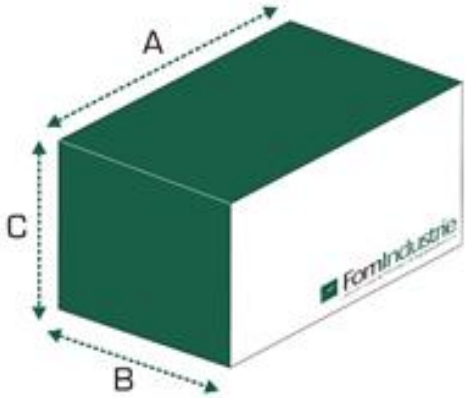
Titan 060	(4 Vices)
Titan 120	(6 Vices)
Titan 180	(8 Vices)
Titan 240	(10 Vices)
Titan 300	(12 Vices)
Titan 360	(14 Vices)

The TITAN machining centre has been designed to perform boring and milling work on aluminium and steel profiles. The mechanical specifications of this modern machining centre and of its control system provide economical use in the production of single pieces.

Standard Configuration

- Electro spindle FOM 16kW 17,000rpm (HSK E 50) with liquid cooling system
- 30 position tool magazine; arranged for angular system with Ø 450mm blade (HSK E 50)
- Pneumatic vices with NC independent positioning:
  - Titan 60: 4 No. vices
  - Titan 120: 6 No. vices
  - Titan 180: 8 No. vices
  - Titan 240: 10 No. vices
  - Titan 300: 12 No. vices
  - Titan 360: 14 No. vices
- Left sliding pneumatic stop
- Head guard – partial guard
- Minimum quantity lubrication (MQL) with pure oil
- Centralized lubrication for all in motion parts
- Photoelectric cell barrier.
- Rear and side fences and swinging gate
- Electric cabinet cooling plant
- Control equipment: POWER-M
- Mobile control console with PC, 17'' touch screen monitor, mouse and keyboard
- Software licence for FSTCAM 5 axes version
- Software licence for tapping cycle
- 2D and 3D simulation of parts, tools and machining operations
- FSTCAM training course (FOM premises)

Overall Dimensions & Weight



Ver	A (mm)	B (mm)	C (mm)	Kg
60	6030	4392	2700	9700
120	12030	4392	2700	12800
180	18030	4392	2700	18000
240	24030	4392	2700	21000
300	30030	4392	2700	26600
360	36030	4392	2700	30200

Power supply	Total power installed	Air consumption for work cycle	Working pressure
3F - 400 V AC - 50 Hz	20/33 kW	828/560 NL/min	7 bar

Technical Characterisitics

Structure

The structure is made of a machine bed with a sliding carriage in its rear section. Both are in electro-welded 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.

Axes Sliding

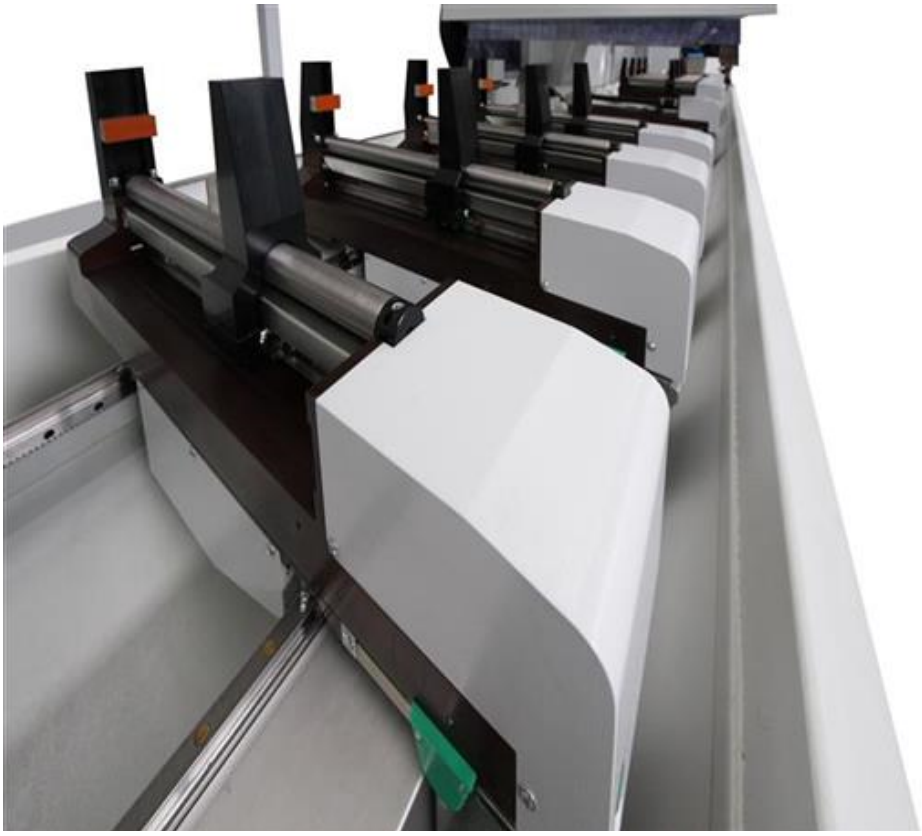
The axis slide on high precision, robust, reliable linear guide-ways with recirculating ball blocks equipped with oil scrapers and with medium/high preloading.

Axes Movement

The independent axis are controlled by brushless 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.



Centralised Lubrication System

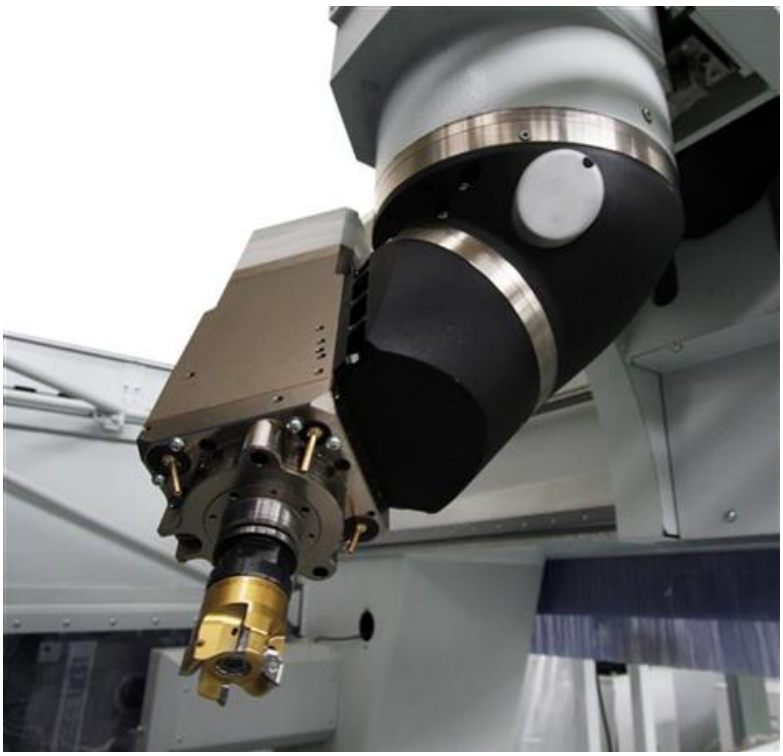
A system automatically sends lubricant to the sliding and movement elements at preset intervals without stopping the machine. The parts lubricated in particular are:

- X axis: 4 slides of the linear guides and rack
- Y axis: 4 slides of the linear guides and recirculating ball screw nut
- 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.

Spindle Head

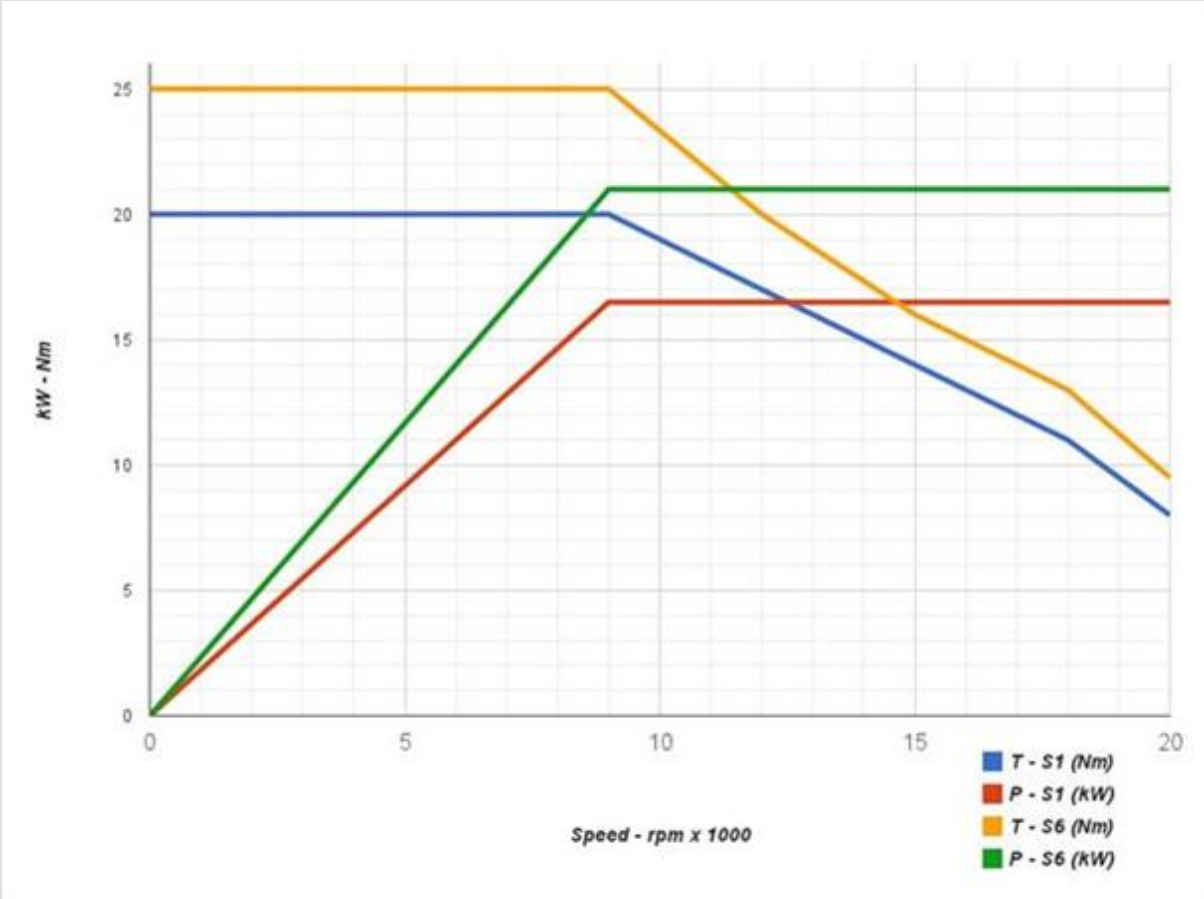
Very compact in size it is made with ductile iron and slides along a system of cross tables in electro-welded steel. A system for backlash recovery and encoder for directly reading the measurements guarantee maximum precision during machining operations.



Electro-spindle

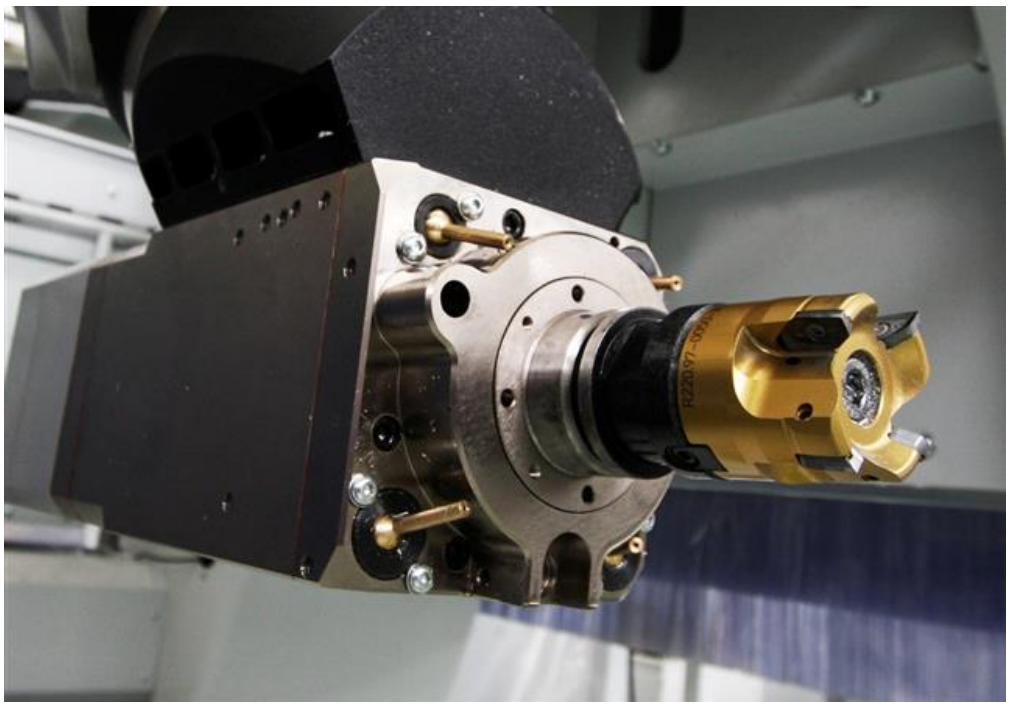
Designed by Fom Industrie, this electro-spindle ensures important performances, both at low number of revolutions as well as at high speed, to satisfy the increasing needs in terms of flexibility. The 16kW water-cooled electro-spindle is equipped with constant torque and C and D axis for executing machining on 5 axes. Rotation speed up to 17,000rpm, adjustable, cooling system HSK E 50 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 electro-spindle axial and radial stress during the work phases. The electro-spindle 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



Tools Lubrication

Lubrication takes place through 6 nozzles (4 integrated in the electro-spindle and 2 in the electro-spindle support head) and 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 (minimum quantity lubrication). Another nozzle, also integrated in the electro-spindle, lubricates the tools mounted on heads with angular units.



Tool Magazine

Located in a gate-protected area in the carriage, it has 30 slots for HSK E 50 tool coupling, 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.

The tool magazine can hold tool coupling for HSK E 50 tools with angular heads for working on the bottom side of the profile and milling cutters up to a diameter of 450mm.

As an alternative, always located in the carriage, is available on request, a tool magazine HSK E 50 with 30 slots with exchanger arm on which, however, is not possible to accommodate tools holder HSK E 50 with angular heads or blades up to a diameter of 450mm for which, if required, are available specific magazines.

Working Area

Situated on the machine bed and made up of:

- 4 pneumatic vices for locking the profiles on Titan - 060
- 6 pneumatic vices for locking the profiles on Titan - 120
- 8 pneumatic vices for locking the profiles on Titan - 180
- 10 pneumatic vices for locking the profiles on Titan - 240
- 12 pneumatic vices for locking the profiles on Titan - 300
- 14 pneumatic vices for locking the profiles on Titan - 360
- 1 sliding pneumatic stop on the left of the working area

The vices and the stop slide on linear guides. Movement/positioning is managed by the numeric control through a proper algorithm. Each vice has a centre roller to facilitate loading the profiles and prevent chip deposit. The mobile jaws, and relative controls for locking the profile, are equipped with rapid manual positioning. It is possible, on demand, to add supplementary vices. As an alternative to the vices and sliding retracting pneumatic stops, it is possible to require electric vices and electric stop (optional).

On request, the working area can be equipped with the “pendular machining” function to allow the operator to load/unload profiles in masked time. The option requires the installation of a second pneumatic retractable stop on the right of the working area. The motorized chip conveyor is installed in the base.

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

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 2006/95/CE (LVD) and Directive 2004/108/CE (EMC). The TITAN 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:

- Spindle head guard with pneumatic lifting
- Mechanical cams and safety micro switches for operator protection during pendular machining phases.
- Photoelectric cell barrier
- Rear and lateral fences and swinging gate

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 OMEGA 200

Mobile control console – network to machine electrical cabinet with RJ 45 attachment for the network line and for the numeric control.

Technical Specifications:

- Mobile control console
- Colour display TFT 17” with LED backlight
- Touch screen monitor
- Standard mouse and keyboard house in a retractable compartment
- CN box Power-M

PC Comprising of:

- Solid state hard disk
- 2 Net interfaces
- USB ports
- 3-year international “on site” warranty for commercial PC

Software Installed:

- Windows 7 Operating System
- FSTCAM
- FST MI for managing the working lists and blocks of manual control and service on line - assistance

Some of the main functions of the Software

- Parametric programming
- Machining optimisations
- Dynamic display of the machining operations
- Graphic display of the working area

FSTCAM Graphic Interface 5 Axes 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:

- Profile cross-section display in DXF format
- Graphic display of the machining operations
- Simplified management of machining process sequence
- Simulation of the machining operations
- 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
- 2D and 3D simulation of parts, tools and machining operations
- Rigid tapping cycle and chase tapping cycle
- Flow drilling management (on request)
- Import of geometries in DXF format (on request)
- Bar code reader (on request). Reads the bar code and starts the machining operations on the selected piece

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.

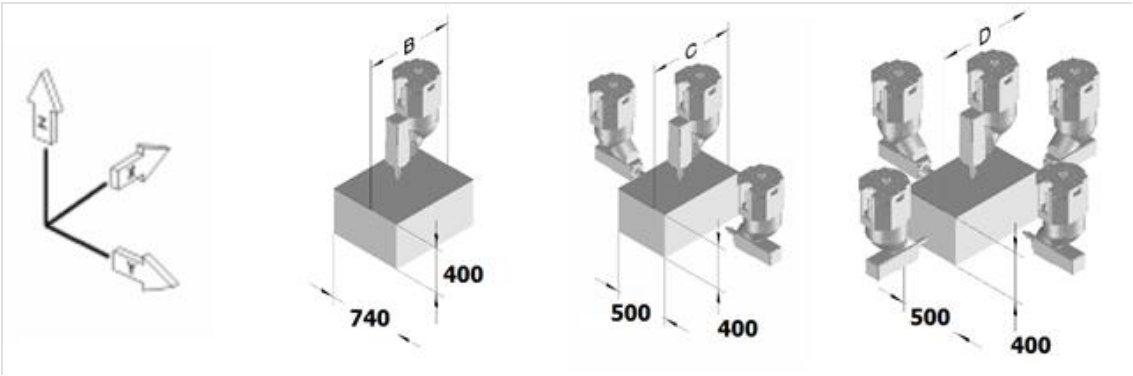
Technical Specifications

Axes travel			
X axis	Longitudinal travel	mm	See table 1
Y axis	Transversal travel	mm	1345
Z axis	Vertical travel	mm	595
C axis		Electro-spindle rotation	-190°/+190°
D axis		Electro-spindle rotation	-100°/+100°
Working capacity			
X axis	Longitudinal travel	mm	See table 1
Y axis	Transversal travel with electro-spindle at 90°	mm	650
Y axis	Transversal travel with electro-spindle at 0°/90°/180°	mm	500
Z axis	Vertical travel	mm	400
Axes movement			
X axis		m./1'	75
Y axis		m./1'	50
Z axis		m./1'	30
C axis		°/sec.	90
D axis		°/sec.	195
Electro-spindle			
Tool holder coupling		Type	HSK E 50
Max power		kW	16 (S1)
Max rotation speed		g/min	17000

Tool magazine		
Tool replacement time	sec.	6
Possible number of tools	No. tools	30
Maximum tool weight	Kg.	6
Maximum tool length	mm	230
Maximum tool diameter	mm	80
Max tool diameter milling cutter	mm	450

Working area

Table 1



	A	B (X axis)	C (X axis)	D (X axis)	X axis travel stroke
Version	Basement length	Working area only upper profile side	Working area on 3 sides	Working area on 5 sides	
60	6030	4390	3950	3050	3950
120	12030	10390	9950	9050	9950
180	18030	16390	15950	15050	15950
240	24030	22390	21950	21050	21950
300	30030	28390	27950	27050	27950
360	36030	34390	33950	33050	33950

Working area data is valid with tools/tool coupling with length 145mm. Weight data reported above are related to the basis configuration of the CNC machining centre.

PIC. 1 – working area on bottom side