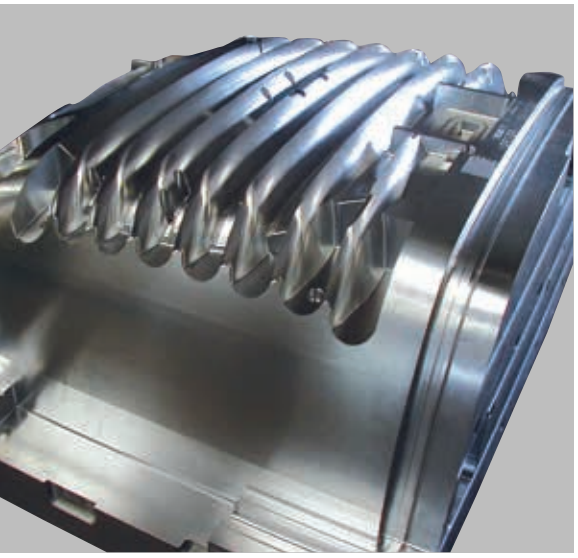
G996

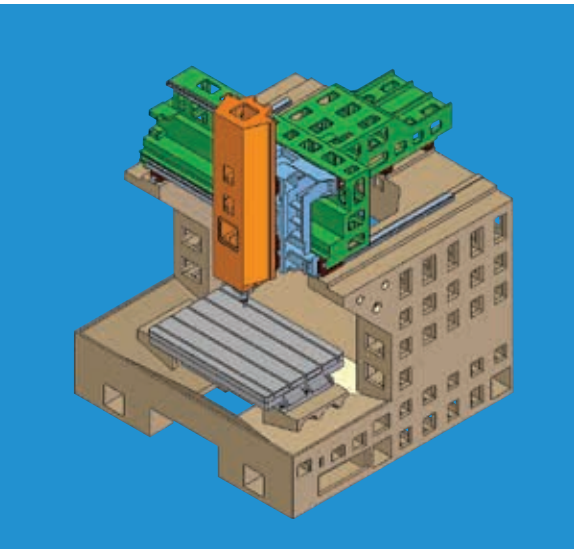
High performance milling systems

FIDIA



Technological development

The G996 is the result of Fidia's long experience in the field of high performance milling.
After years spent satisfying the need for improvement in the quality and accuracy of complex machining, since the launching onto the market of machine tools designed for finishing, Fidia has responded to a new challenge in which the rationalization of the production cycle has become an absolute priority.
Combining high dynamics with stability, stock removal with high precision finishing and modular design: the G996 has achieved a new level of performance.
The result is a system offering various milling equipment and different worktable combinations able to satisfy most machining requirements with 3 and 5 continuous or indexed axes.
Sectors in which the G996 can find application include all those where high precision and excellent stock removal are required, from the moulds and dies sector to general machining and the aeronautical industry.

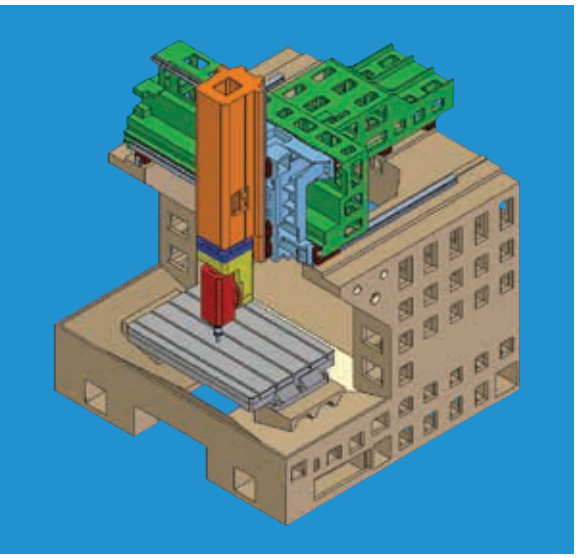


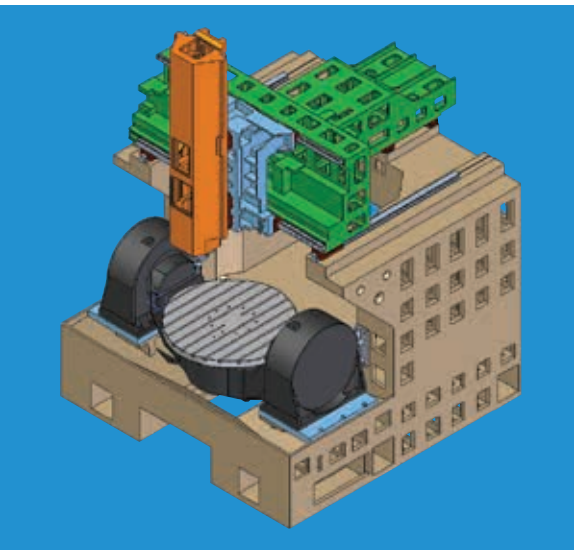
Machine tool structure

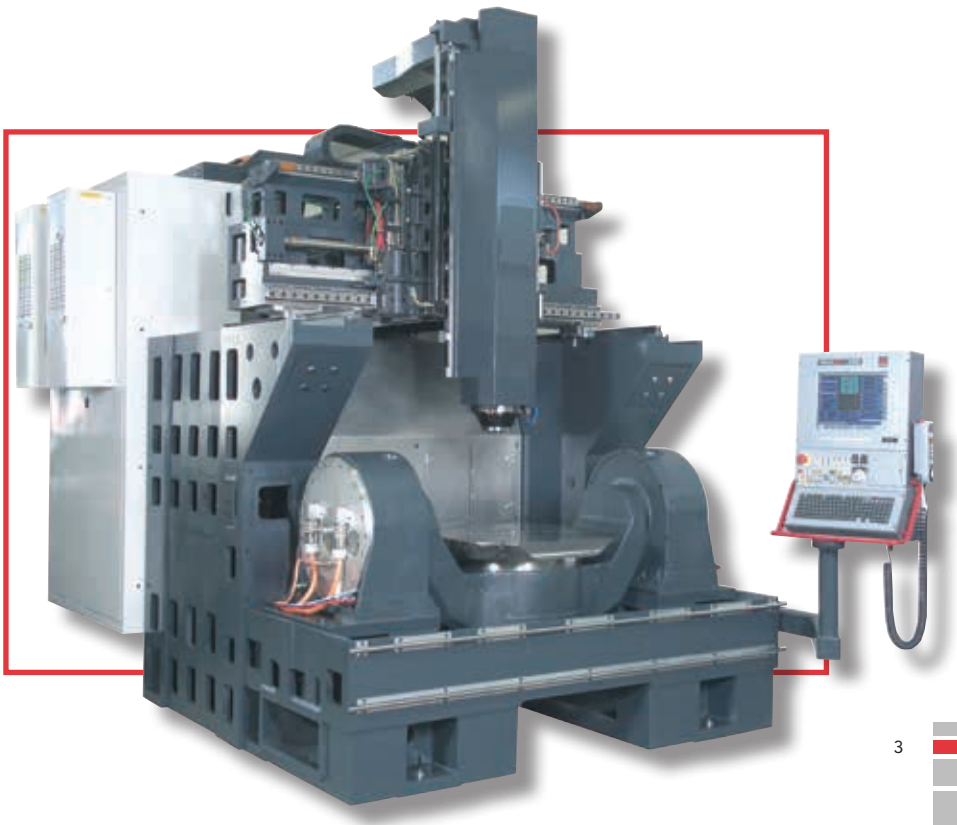
The large cast iron bed provides a stable support for the moving parts, while the open front ensures wide visibility.
The moving components, also made of cast iron, have been designed for high acceleration with no dynamic deformation. At the same time, they ensure the damping capacity required in order to take full advantage of the high spindle torque.
The use of spheroidal graphite cast iron and a system of guides with 6 support points for each axis has made this difficult compromise possible.

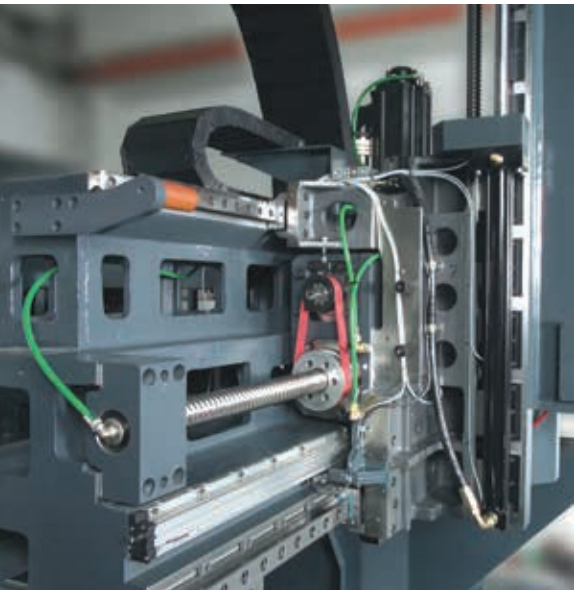
No Foundation

Its self-supporting structure allows installing the machine directly on a standard industrial floor.







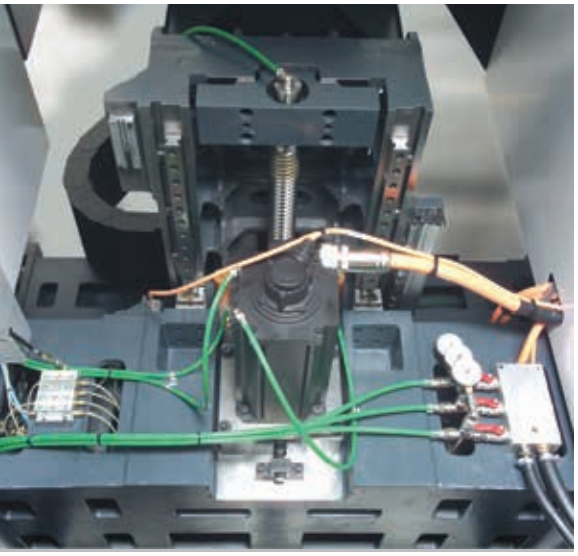


Dynamics and thermal stability control

The kinematics chain is based on rotating nut and fixed ball screw technology on all linear axes.
This solution has numerous advantages:

- larger diameter ball screws;
- reduction of moment of inertia;
- extreme rigidity in motion transmission;
- heat control with coolant flow through hollow ball screws.

All the parts generating heat, such as axis motors, nut supports, electrospindles are monitored and cooled by means of a central conditioning system.
Furthermore, dedicated sensors measure the ambient and structural temperatures providing an overall monitoring picture.
In this way, maximum accuracy is achieved even with lengthy machining cycles requiring numerous re-machining operations and tool changes.



Configurability

The G996 3-axis standard configuration is equipped with a high-speed spindle that is able to deliver High Performance milling, boring, drilling and tapping.
As an option, the vertical axis can be fitted with a robust head with two indexed axes (BSH version) or a continuous head with 5 axes (M5A
version).

The fixed worktable can be replaced by different roto-tilting (RT version) tables (trunnion type), each being particularly well dimensioned for the machining of complex geometrical forms, that are equipped with torque motors bringing the technical characteristics of these solutions to the highest levels of performance. The maximum benefits deriving from the increased capabilities of programming systems on 5 continuous axes are also guaranteed.
Interfacing with standardized and modular automatic pallet systems, such as WPM and MP (Multi pallet), reduces down time and allows for full automation of the production cycle.

Tool Changer and Automatic Presetting

24 to 84 position tool magazine is located in the machine bed. The magazine has a large access cover and is suitably protected from dust, fluids and swarf.
The tool measuring probe, which uses a laser device mounted in the machine bed, checks the length, diameter and shape while the tool rotates at working speed in order to reduce machining errors.
Also available, measure and verification of special tools:

- multiple cutting edge;
- angular heads;
- advanced ID Chips management.

FMS

Flexible Manufacturing System

The new FMS system designed by Fidia is equipped with a sophisticated software that optimizes and exalts its operative characteristics. This system is the Fidia answer to the more and more pressing request of increasing the workshop automation level, and integrates a powerful and versatile pallet system shared between more than one G996 machine.

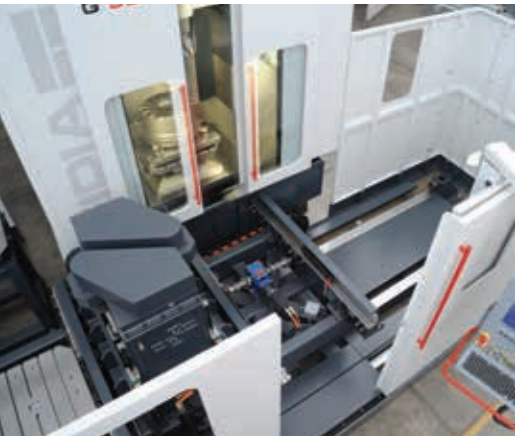
The FMS platform serves independent working islands of minimum 2 machines each, and allows for the complete machining of complex components in 3 or 5 axes, starting from the rough part.

This system is the ideal solution for a highly developed workshop environment, requiring the best standards of automation levels.

The powerful dedicated software automatically manages and optimizes the production flow without intervention of the machine operator. Such a way of functioning pursues the following goals:

- reduction of waiting times;
- simplification of programming;
- optimization of tool wear-out;
- full monitoring of production flow;
- reduction of human error risks;
- never-ending 7/7 & 24/24 production.

Each machine can be also used in a standalone way, nonetheless granting the normal functioning of the FMS system with the other machines.



Coolant and Chip conveyor Systems

Minimum spray mist lubrication for tools is standard, and a swarf collection bin with a large drawer is incorporated in the machine tool bed.

Other systems are available as options:

- external low pressure lubrication / cooling;
- air blow through the tool centre;
- high pressure coolant through the tool centre.

Each of these options is provided of suitable chip conveyor and collection system with tanks and filters of various sizes.

Dust and mist collection units

Machine tool components and the machining environment can be protected by optional dust and mist collection systems that efficiently recover volatile substances such as graphite or resin dust, and oil mist.

The total enclosure of the work area together with optional protection with air sealed guideways and ballscrews enables the machining of highly abrasive materials such as ceramics and carbon fibre.

Vibration monitoring system

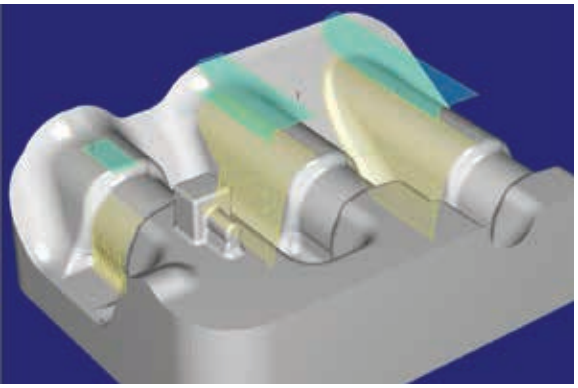
The spindle is equipped with an accelerometer to measure vibration, in order to check tool unbalancing or breakage. Two vibration speed thresholds are available: warning threshold and alarm threshold. The vibration value is monitored and displayed on the CNC screen.

HMS

Check and compensate each positioning geometrical error in 5 axis RTCP within the machine working envelope.
It consists of a simple and powerful instrument to grant the highest level of accuracy without complex maintenance interventions.

The C20 numerical control

The Fidia C20 numerical control takes full advantage of the potential offered by combining the performance of the Intel Core i7 and the RISC Power PC processors. It is conceived to manage the most sophisticated high speed applications running at 5 axes with RTCP. It is equipped with Windows 10 Enterprise 64 bit operating system in multitasking mode.



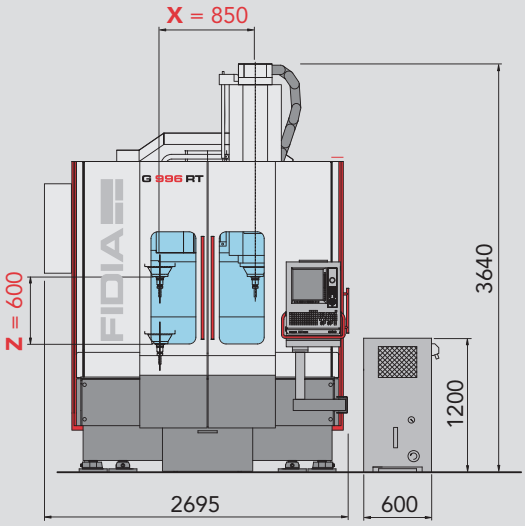
Simple and reliable machining

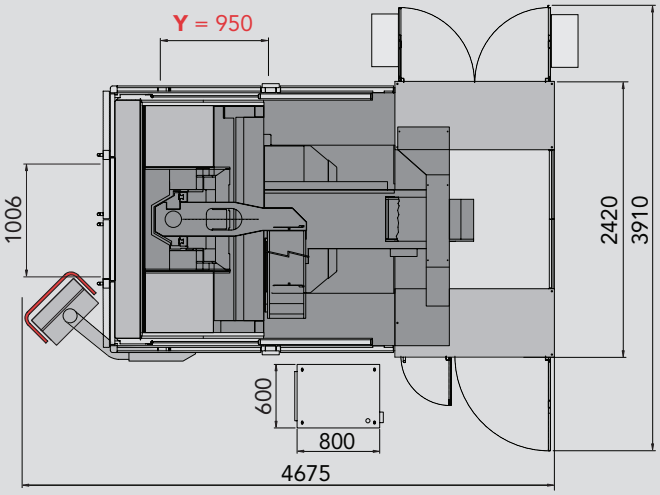
The C20 is equipped with a 19" TFT video and thanks to its HI-MILL 3D CAM and ISOGRAPH 2½D CAD/CAM it directly imports CAD mathematical models in IGES,VDA-FS, DXF, DWG formats, enhancing but at the same time simplifying tool path management.
Mechanical machining such as slots, threads and pullers are programmed directly on board of the machine in total safety thanks to its soft keys and to the possibility to simulate in real time any kind of tool path.

High speed milling

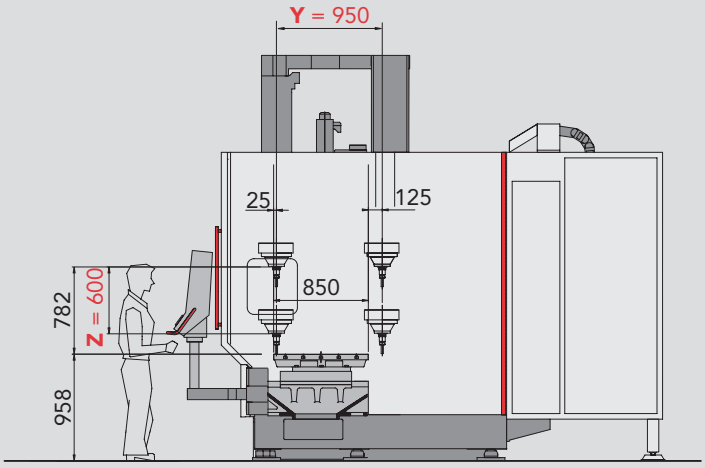
The parameters, adapted to the specific dynamic characteristics of the machine tool, are optimized by the following path control software functions:

- dynamic Look-Ahead with advanced feed control for curves;
- Active Tuning and Active Damping to optimize performance in terms of accuracy, surface quality and execution times;
- set of customized parameters for different machining conditions (roughing, semi-finishing, finishing and rest-machining) recalled by G functions;
- Jerk Control (control of variations in acceleration).

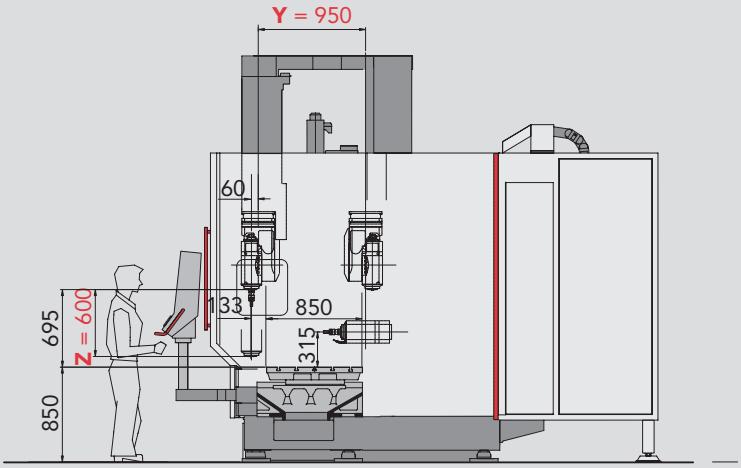




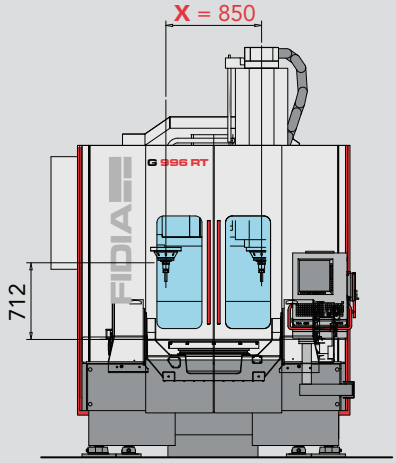
G996V

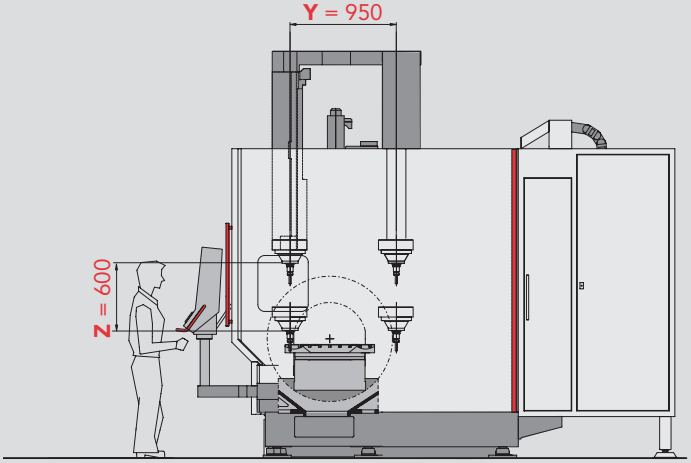


G996BSH



G996RT/P-1000





Technical data

Linear axis travel	
X	850 mm (33″)
Y	950 mm (37″)
Z	600 mm (24″)
Linear axis feed	
X Y Z	45 m/min (1772 ipm)
Positioning precision	
X Y Z	± 0.003 mm (± 0.00012″)
Maximum acceleration	
X Y Z	10 m/s² (394 inches/s²)
Tool magazine	
positions	24 - 42 - 84
Standard machine tool weight	
	17000 kg (37478 lbs)

Milling heads

Electrospindle 3 axes	**M3A/30-24**	**M3A/46-16**
Maximum power (S6)	30 kW	46 kW
Maximum torque (S6)	105 Nm	183 Nm
Max. spindle rotation speed	24000 1/min	16000 1/min
Toolholder	HSK-A63	HSK-A63
Bi-rotary heads	**indexed BSH**	**continuous M5A**
Work area (X,Y)	970 x 1070 mm (38″ x 42″)	850 x 950 mm (33″ x 37″)
B axis travel	-102°/+24°	±110°
C axis travel	-177°/+180°	± 360.1°
B and C axis pitch	3°	continuous
Max. spindle rotation speed	30000 1/min	32000 1/min
Maximum power (S6)	22 kW	7.5 kW
Toolholer	HSK-E50	HSK-E40

Standard table

Dimensions	1200 x 850 mm (47″ x 33″)
Load capacity	2000 kg (4409 lbs)
No. and dimensions of T slots	n° 4+1(H7)x18 mm (0.71″) pitch 160 mm (6″)

TR Table		**P-1000**
Platter dimensions		Ø 800 mm (Ø 32″)
Max. rotating diameter (swing)		1000 mm (3.9″)
A axis	stroke speed acceleration	±125° 75 1/min 2000 °/s²
C axis	stroke speed acceleration	rollover 100 1/min 2000 °/s²
Load capacity		1200 kg (2645.5 lbs)

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