

# K Range

High performance milling systems



**FIDIA**   
Giving shape to design

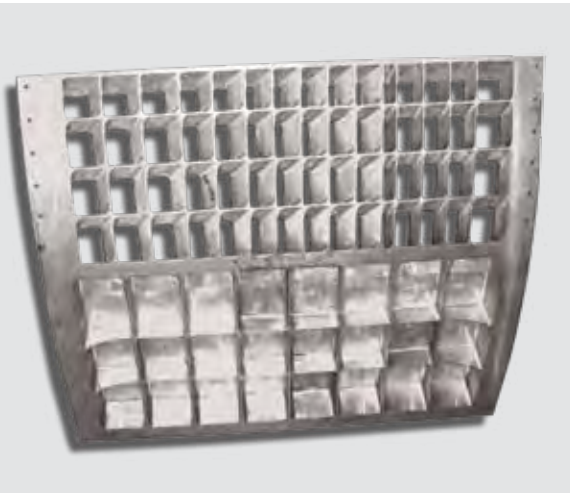


Years of investment in research and development have led to Fidia's success in the high-speed milling sector right from the early 90s.

A reduction in machining times and hand finishing is the most significant result, to which may be added the possibility of working with very hard materials, simplifying production cycles and producing parts just one set-up operation.

Only specifically designed machine tools can guarantee, at the same time, high feeds, accuracy and surface quality.

The K211 and K411, Fidia's high-speed milling centres, are used in the production of moulds and dies for the automotive industry (body parts and large plastic components, such as dashboards and bumpers); steel dies for tyres and light alloy moulds for prototypes; components for the aeronautical industry, turbines and compressors; complex resin models or for styling applications; ceramic or composite components for the aerospace industry.





The criteria used to determine kinematic chain are such as to grant excellent performance in terms of removal capacity, accuracy and speed.

Design attention was focused on achieving a compact bi-rotary head with high removal capacity, continuous movement of the axes and powerful hydraulically operated clamping systems.

Axis morphology of the KR, KRV and Y2K make these models particularly suitable for the machining of larger pieces.

A rotary table is used on the KR version integrated, as an alternative to the fixed table, with the axis of rotation positioned in the proximity of the external limit of the Y axis travel.

The KRV version is the combination of a rotary table with a translating movement guided by the NC.



With Y2K version, different areas of the same part or different parts are machined by the use of two machine tools positioned opposite each other.

All models are equipped with the C20 Fidia NC.





## Technical solutions

### Fixed bed structure

The choice of a fixed bed structure was determined by the following criteria:

- constancy of the forces independently of the weight of the work-piece, allowing for optimum milling quality;
- optimum visibility of the part being machined;
- wide range of possibilities for customization.

The “high bed” version allows for a reduction in the moving masses giving superior dynamic performance.

The bed is made in cast iron, while the mobile parts of the equipment of the 3 axes are made of steel in order to obtain the best mass-rigidity ratio.

The fixed cast iron worktable is suitable to grant high loading capacities.



### The components

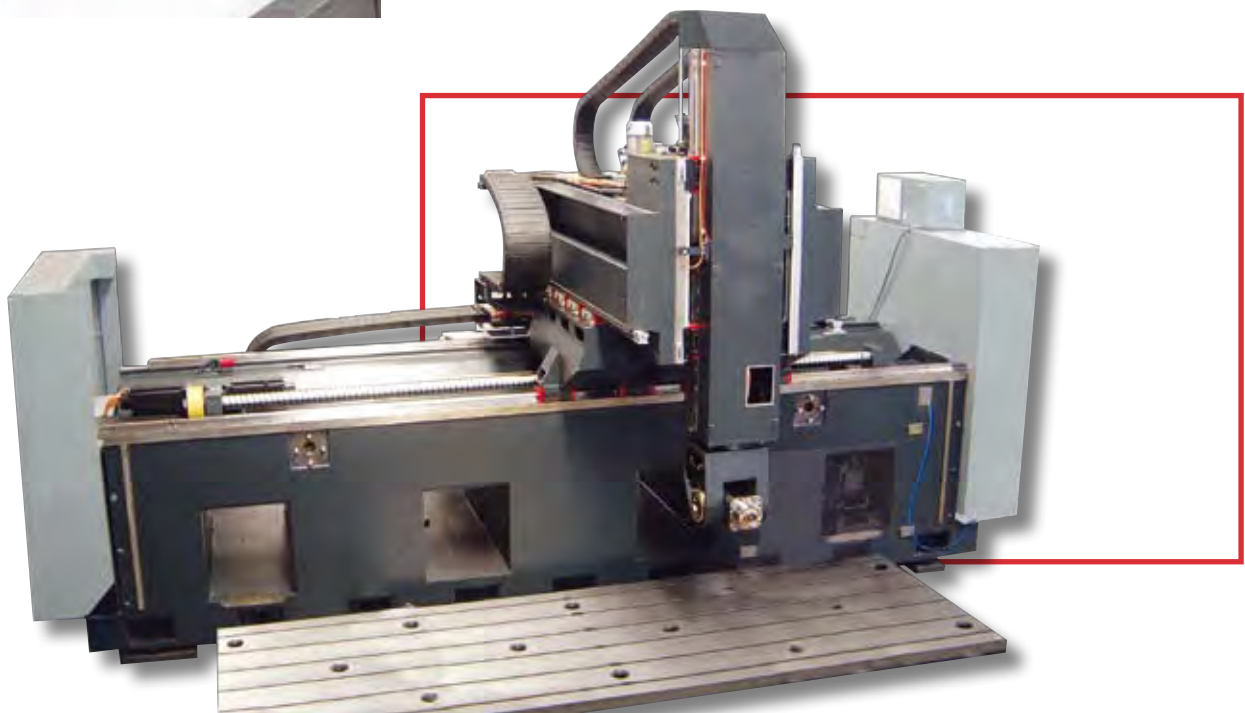
The generous dimensions of the guides and the high number of rolling shoes give the system a balanced rigidity.

The digital technology used for the axis drives optimizes the machine dynamic behaviour, resolution and machining accuracy.

Maximum accuracy and its maintenance over time are guaranteed by the direct type transducers for both linear and rotary axes.

### Thermal stabilization

The significant reduction in thermal drift, ensuring greater accuracy during long finishing and re-machining operations, is achieved thanks to a controlled temperature circuit acting on the machine’s most sensitive parts.





## Tool magazine and tool presetting

Chain magazines coming in different tool numbers are housed in the machine bed, suitably protected from swarf and coolant.

Tool measurement, by means of a laser probe, is done while spindle is in rotation: length, diameter and tool shape are therefore checked under real operating conditions.

Also available, measure and verification of special tools:

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



## Dust suction unit

An adequate cleaning system protects the machine components as well as its working area. The system efficiently captures and removes volatile substances. Specific covers and pressurized solutions allow for the machining of high abrasive materials such as ceramics and carbon fibres.



## 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 video.

## Head Measuring System

The HMS system is a device for measuring and adjusting bi-rotary heads. Fitted with three sensors connected to the NC, the device is able to check and automatically correct geometric errors, positioning accuracy and the RTCP bi-rotary head parameters.

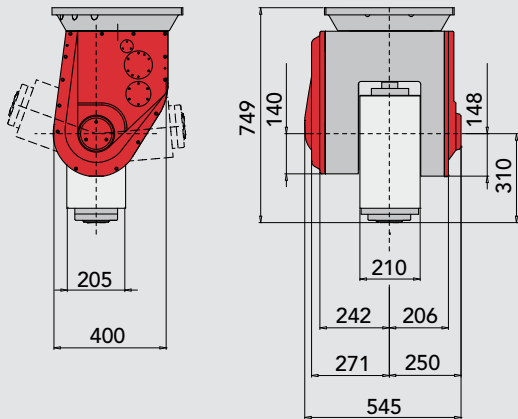
This enables checks on the head geometry to be carried out whenever required, avoiding costly, lengthy and often unnecessary service interventions.



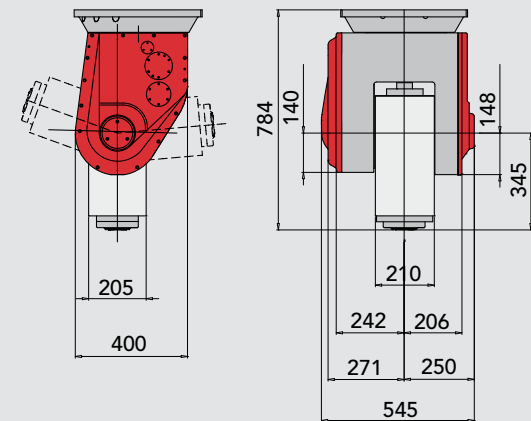


## Continuous bi-rotary head

Series K machine tools are provided with continuous, powerful, compact birotary heads. A and C axes can machine both through-high-dynamics-continuous interpolation, and through the positioning mode, with the operator interactive command. In case of heavy duty removal operations, the axes can be stiffly clamped by means of powerful hydraulic brakes. Fidia head, equipped with a built-in spindle driven through a synchro motor, is provided with servomechanisms (automatic backlash recovery), and it is able to perform 0.001° resolution positionings for any type of machining: both 5-axis roughing and finishing operations. Its compact structure eases the tool access to the most critical surfaces.



HSK63A



HSK100A

A axis travel	+95° ÷ -110°	
C axis travel	± 200° (optional ± 360°)	
A, C max continuous speed	3600 °/min (optional 5000 °/min)	
Accuracy/repeatability (VDI/DGQ 3441 - ISO 230-2)	6 / 4 arc sec	
Max spindle speed	24000 1/min	14000 1/min
Max spindle power	55 kW	
Max torque	88 Nm	
Constant power range	6000 ÷ 24000 1/min	6000 ÷ 14000 1/min
Toolholder	HSK63A	HSK100A





## The C20 numerical control

The Fidia C20 numerical control takes full advantage of the potential offered by combining the performance of the Pentium 4 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 XP Professional operating system in multitasking mode.

### Simple and reliable machining

The C20 is equipped with a 17" 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

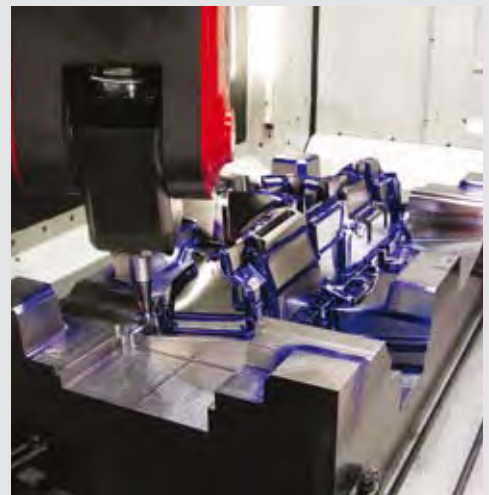
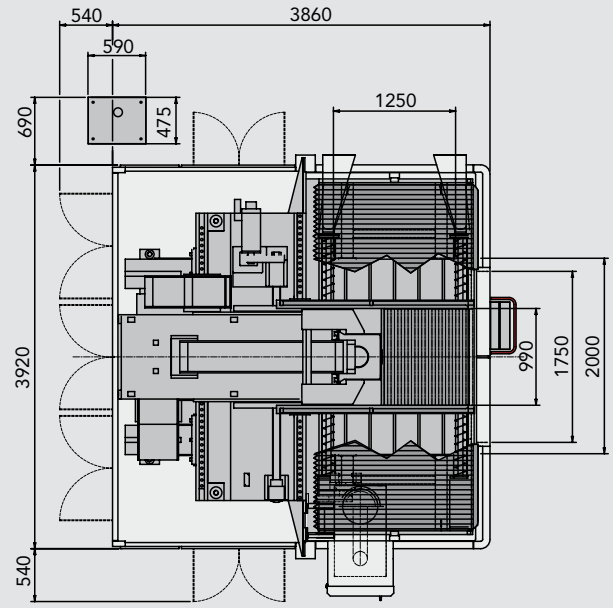
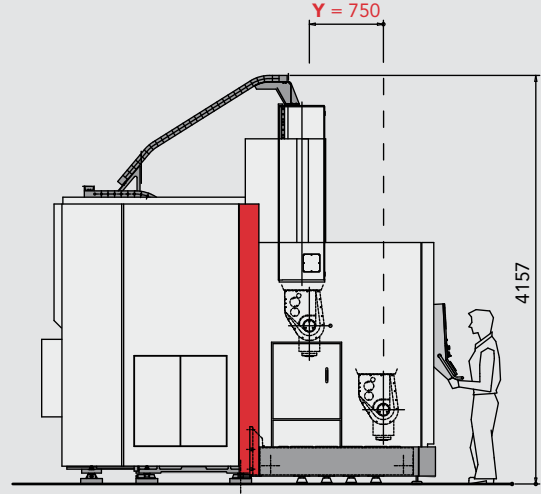
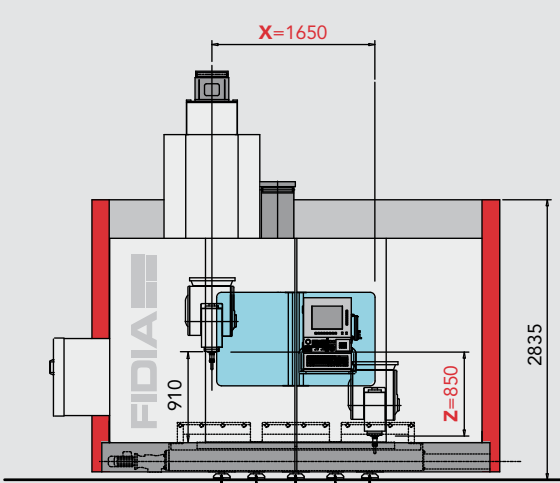
The parameters, adapted to the specific dynamic characteristics of the machine tool, are optimized by the following path control software functions:

- 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).





# K199







Technical data	K199
<b>Linear axis travel</b>	
X (*)	1650 mm (65")
Y (*)	750 mm (29.5")
Z	850 mm (33.5")
<b>Linear axis speed</b>	
X Y Z	30 m/min (1181 ipm)
<b>Positioning accuracy</b>	
X Y Z	$\pm 0,005 \pm 0,005 \pm 0,004$ mm ( $\pm .0002'' \pm .0002'' \pm .00015''$ )
<b>Work-piece table:</b>	
Dimensions	2000 x 1250 mm (79" x 49")
T-Slots	n° 5 - pitch 250 mm (10")
Loading capacity	12000 kg (26455 lbs)
<b>Tool magazine</b>	
No of positions	24 - 42 - 60
<b>Weight</b>	
	18300 kg (40344 lbs)

(\*) +150 mm (6") rotating the C axis with vertical spindle



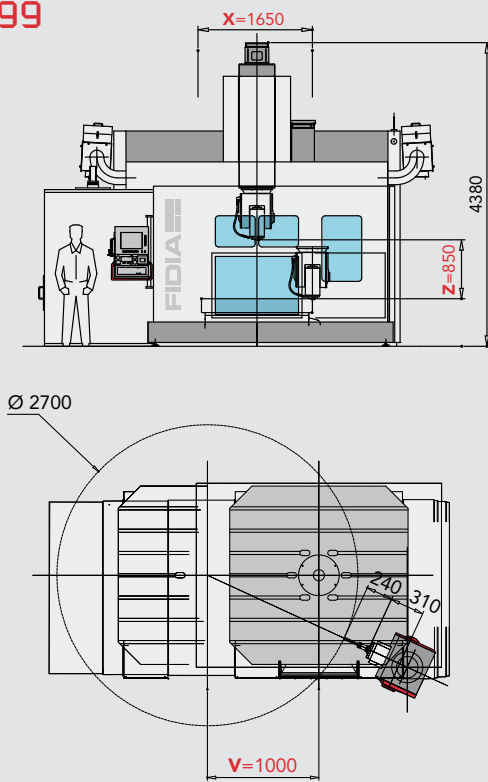


## KRV199 KR199

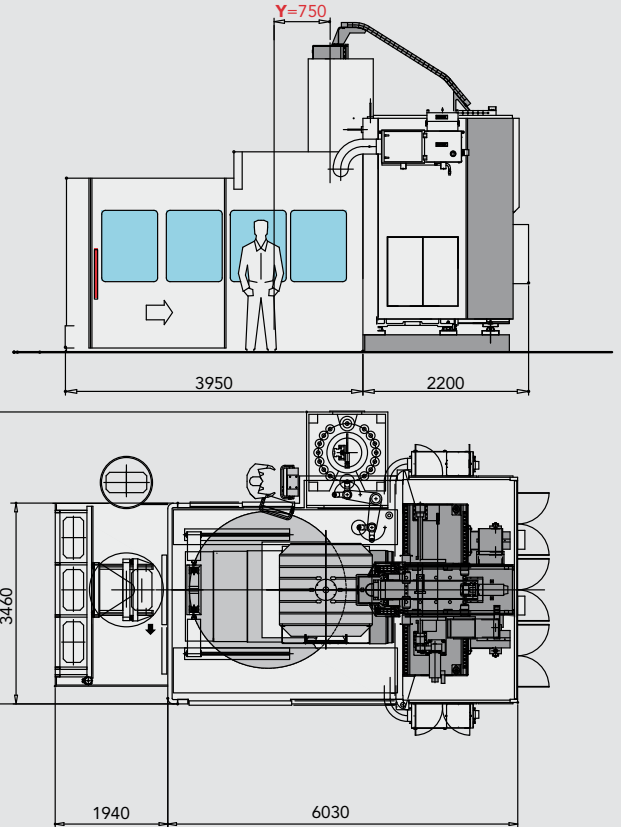
A remarkable increase of the operating volume is obtained by integrating rotary and roto-translating tables guided by a NC management of the 6th and 7th axis. The coordinate systems always refer to the piece being machined in any allowed position.

The 5-side access to the part to be machined, and the prearrangement for pallet systems are KR199 and KRV199 main advantages.

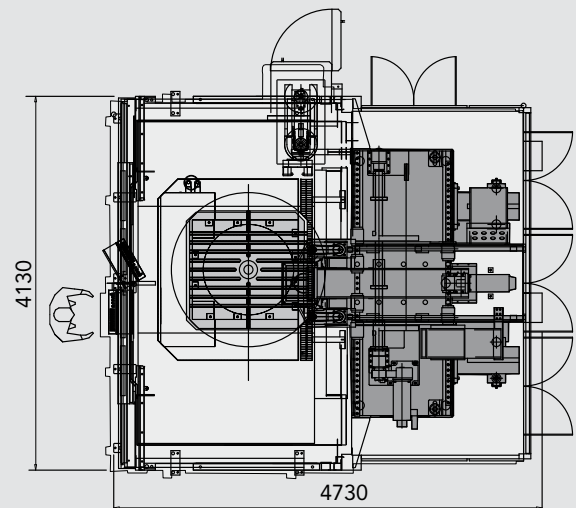
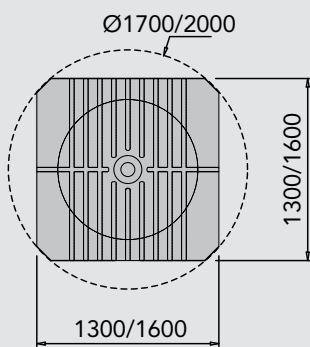
### KRV199



Workable volumes with tools L=240



### KR199





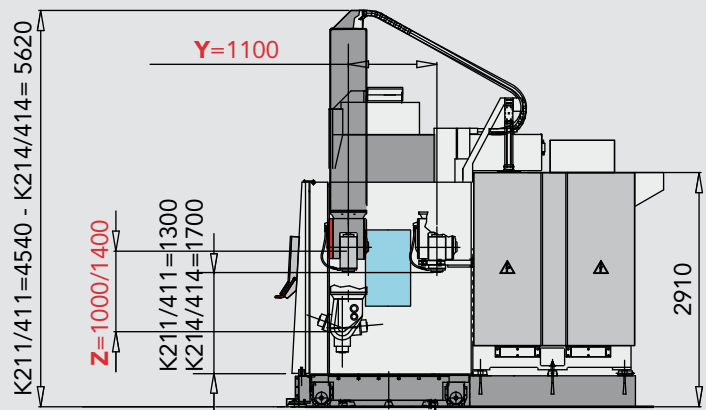
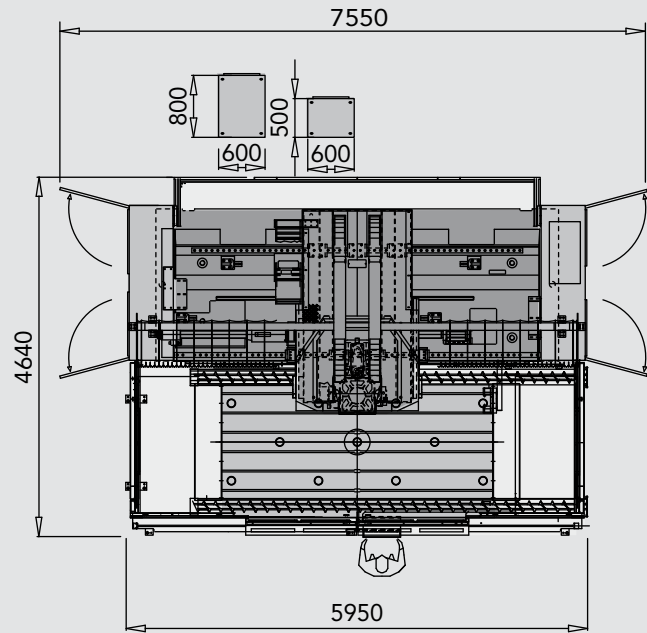
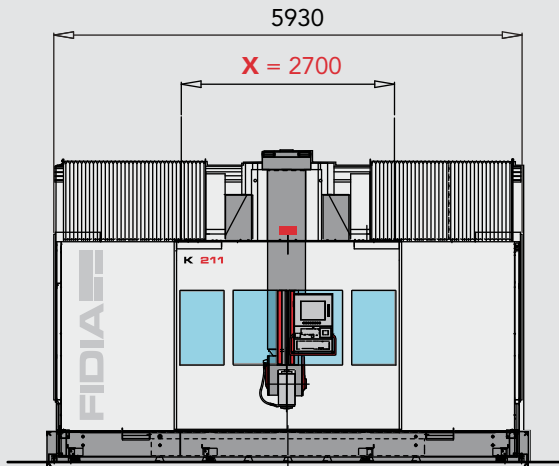
Technical data	KR199	KRV199
<b>Linear axis travel</b>		
X (*)	1650 mm (65")	
Y (*)	750 mm (29.5")	
Z	850 mm (33.5")	
<b>Linear axis speed</b>		
X Y Z	30 m/min (1181 ipm)	
<b>Positioning accuracy</b>		
X Y Z	± 0,005 ± 0,005 ± 0,004 mm (± .0002" ± .0002" ± .00015")	
<b>Work-piece table: U axis</b>	<b>rotary</b>	<b>roto-translating</b>
Dimensions	Ø 800 mm (31") 1300 x 1300 mm (51" x 51") 1600 x 1600 mm (63" x 63")	1600 x 1600 mm (63" x 63")
V axis	-	1000 mm (39")
T-Slots	n° 9 pitch 100 mm (4")	n° 7 - pitch 200 mm (8")
Loading capacity	8000 kg (17637 lbs)	10000 kg (22046 lbs)
<b>Tool magazine</b>		
No of positions	24 - 42 - 60	
<b>Weight</b>		
	20000 kg (44092 lbs)	22000 kg (48501 lbs)

(\*) +150 mm (6") rotating the C axis with vertical spindle

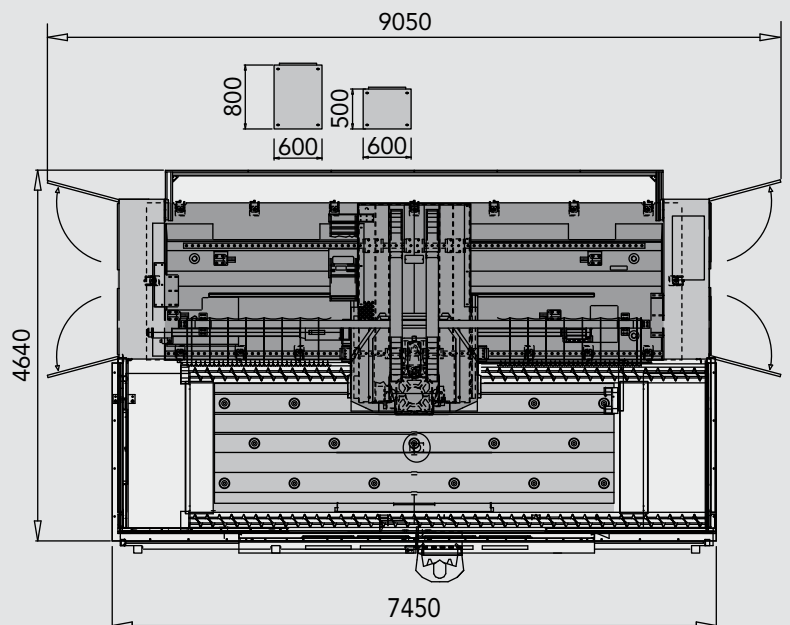
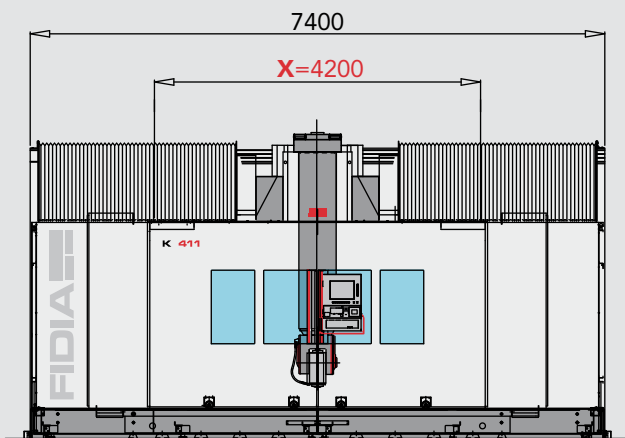




## K211 K214



## K411 K414





Technical data	K211/214	K411/414
<b>Linear axis travel</b>		
X (*)	2700 mm (106")	4200 mm (165")
Y (*)	1100 + 150* mm (43")	
Z	1000/1400 mm (39"/55")	
<b>Linear axis speed</b>		
X Y Z	24 m/min (944.8 ipm) (Optional X,Y 60 m/min (2362 ipm), Z 30 m/min (1181 ipm))	
<b>Positioning accuracy</b>		
X Y Z	± 0,006 ± 0,005 ± 0,004 mm (± .00024" ± .0002" ± .00015")	± 0,0075 ± 0,005 ± 0,004 mm (±.0003" ±.0002" ±.00015")
<b>Work-piece table:</b>		
Dimensions	3500 x 1500 mm (138"x 59")	5000 x 1500 mm (197"x 59")
T-Slots	n° 6 - pitch 250 mm (10")	
Loading capacity	22000 kg (48501 lbs)	32000 kg (70547 lbs)
<b>Tool magazine</b>		
No of positions	42 - 84	
<b>Weight</b>		
	26000 kg (57319 lbs)	32000 kg (70547 lbs)

(\*) +150 mm (6") rotating the C axis with vertical spindle



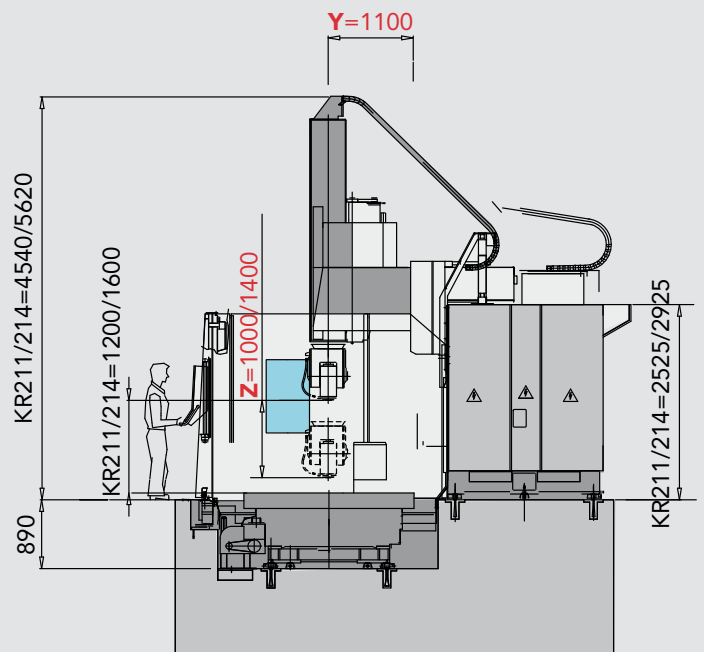
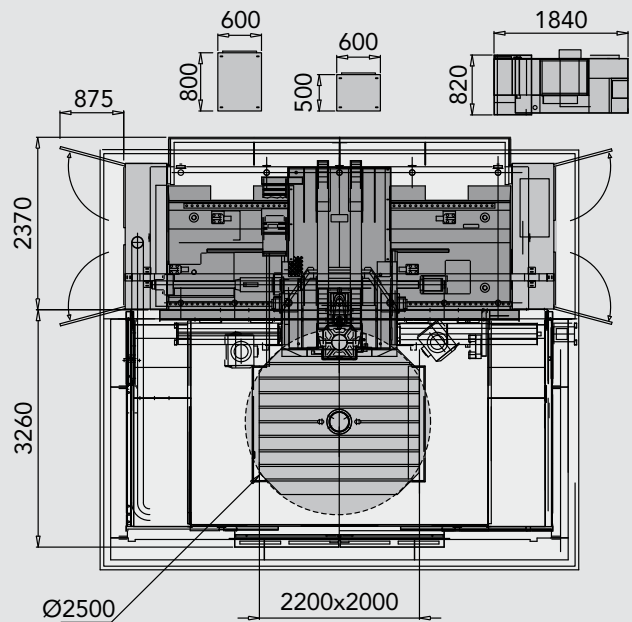
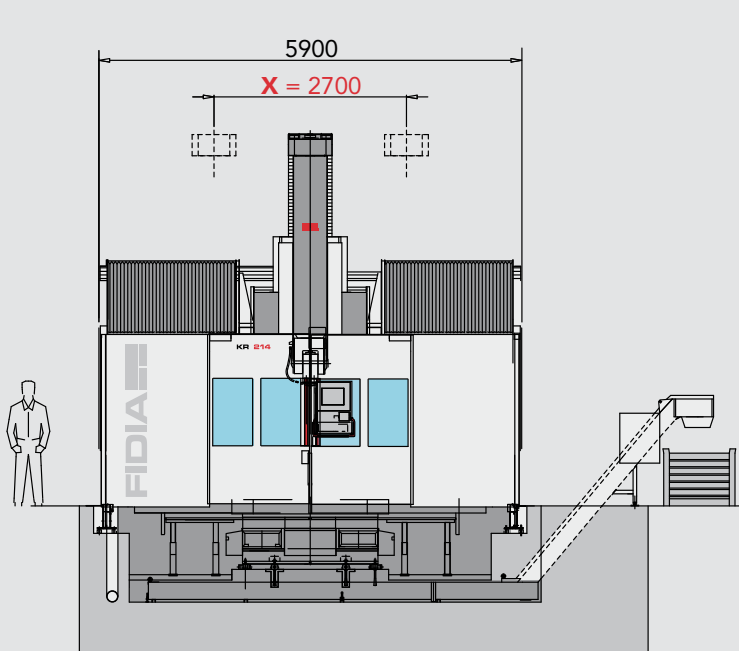


## KR211 KR214

Machining of large dies and extra-dimensioned components are carried out efficiently by the KR configurations.

The use of the 6th axis as rotary workpiece table guarantees max accessibility from all sides. Head and table combined rotations are automatically handled by the NC by rotating the system coordinates.

In just one placement it is possible to operate on a such working area that is usually offered only by bigger gantry machines.

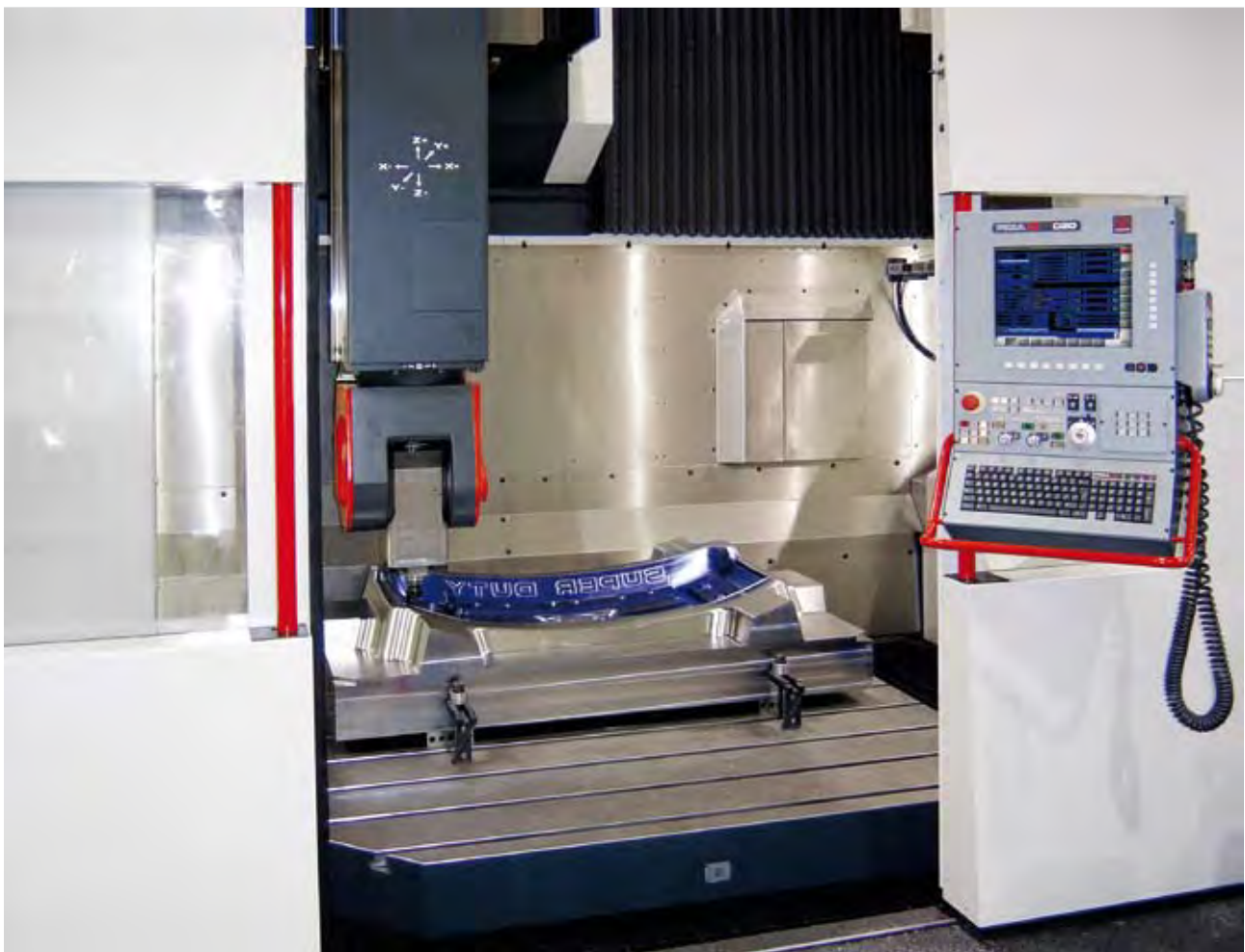


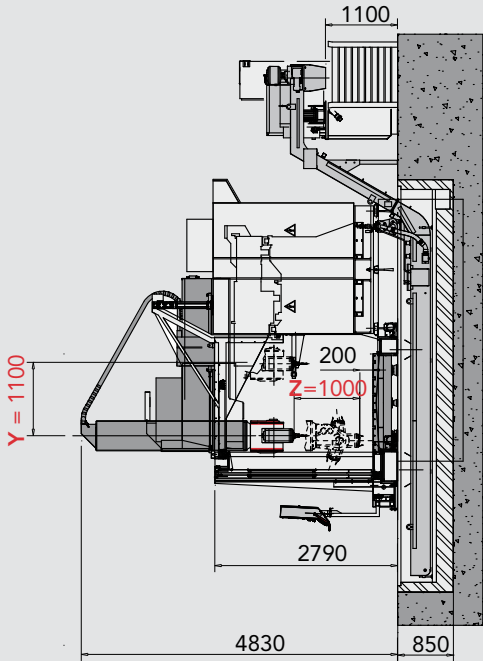


Technical data	KR211	KR214
<b>Linear axis travel</b>		
X (*)	2700 mm (106")	
Y (*)	1100 mm (43")	
Z	1000 mm (39")	1400 mm (55")
<b>Linear axis speed</b>		
X Y Z	24 m/min (944.8 ipm)	
<b>Positioning accuracy</b>		
X Y Z	± 0,006 ± 0,005 ± 0,004 mm (± .00024" ± .0002" ± .00015")	
<b>Rotary table: U axis</b>		
Dimensions	2200 x 2000 mm (86.6" x 78.7")	
T slots	28 mm pitch 200 mm (8")	
Max load	15000 kg (33069 lbs)	
Max tangential moment **	30000 Nm	
Driving torque	20000 Nm	
<b>Tool magazine</b>		
No of positions	42 - 84	
<b>Weight</b>		
	38000 kg (83774 lbs)	38500 kg (84877 lbs)

(\*) +150 mm (6") rotating the C axis with vertical spindle

(\*\*) With clamped axis

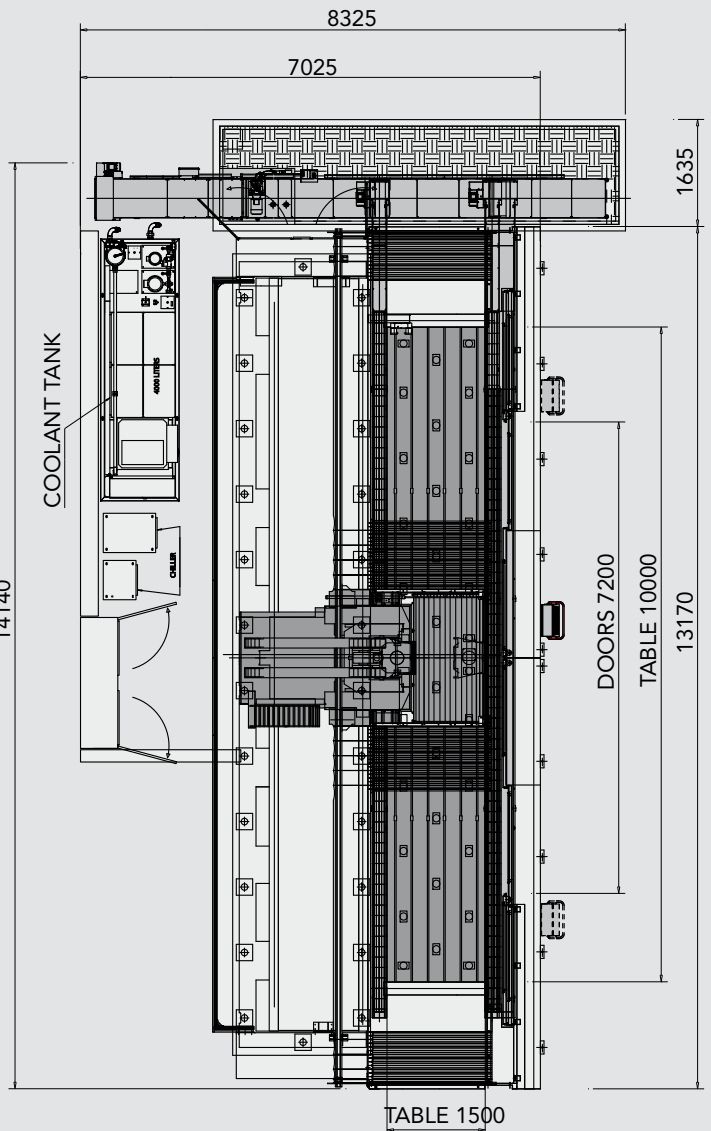
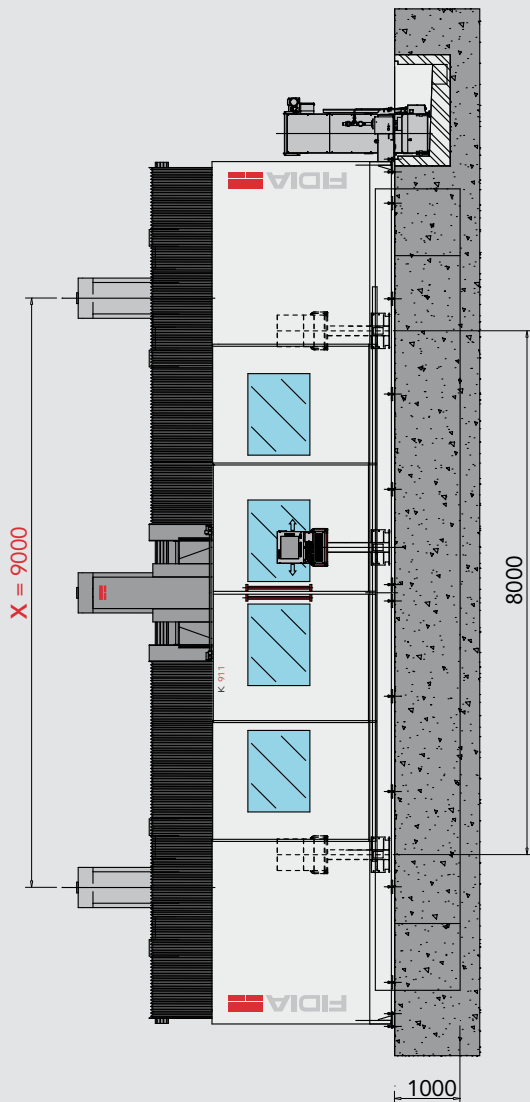




## K611 K811 K911 K614 K814 K914

K series, provided with "X modular" axis, has been designed for the machining of narrow/long size, structural components, made of light alloy, typically requested by the aerospace sector.

The rack/pinion system guarantees an excellent dynamics for the X axis, whatever the length.

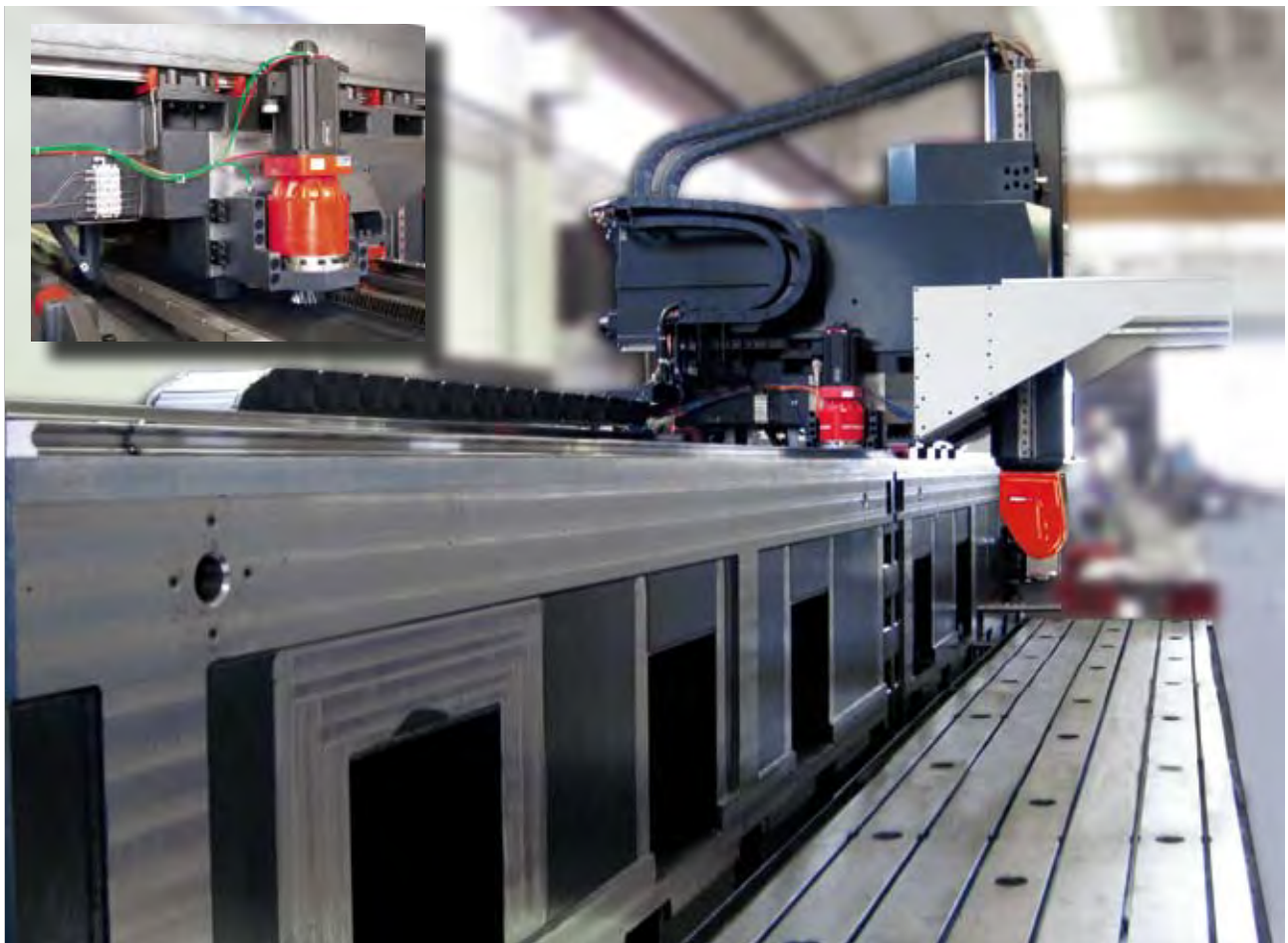


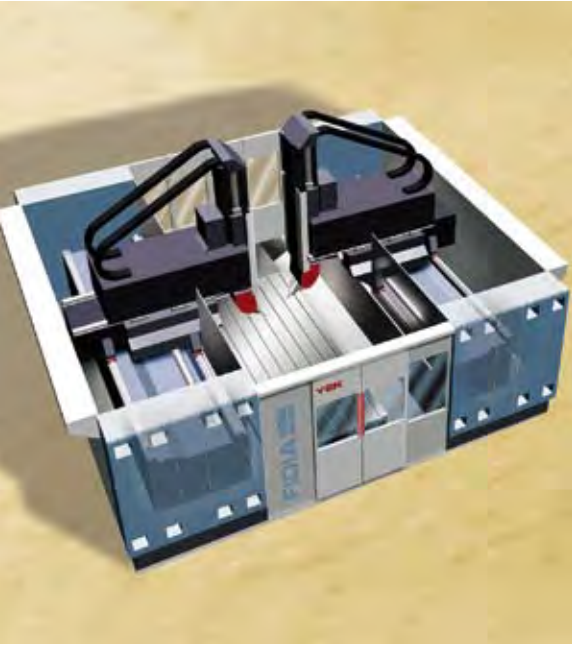




Technical data	K611/614	K811/814	K911/914
<b>Linear axis travel</b>			
X (*)	6000 mm (236")	8000 mm (315")	9000 mm (354")
Y (*)	1100 mm (43")		
Z	1000/1400 mm (39"/55")		
<b>Linear axis speed</b>			
X	30 m/min (1181 ipm)		
Y Z	24 m/min (944.8 ipm)		
<b>Positioning accuracy</b>			
X	± 0,010 mm (±.0004")	± 0,0125 mm (±.0005")	± 0,0125 mm (±.0005")
Y Z	± 0,005	± 0,004 mm (±.0002")	±.00015")
<b>Work-piece table:</b>			
Dimensions	7000 x 1500 mm (275.5" x 59")	8500 x 1500 mm (335" x 59")	10000 x 1500 mm (393.7" x 59")
T-Slots	n° 6 - pitch 250 mm (10")		
Loading capacity	22000 kg (48501 lbs)	32000 kg (70548 lbs)	37000 kg (81571 lbs)
<b>Tool magazine</b>			
No of positions	42 - 60 - 84 - 120		
<b>Weight</b>			
	38000 kg (83775 lbs)	44000 kg (97003 lbs)	47000 kg (103617 lbs)

(\*) +150 mm (6") rotating the C axis with vertical spindle



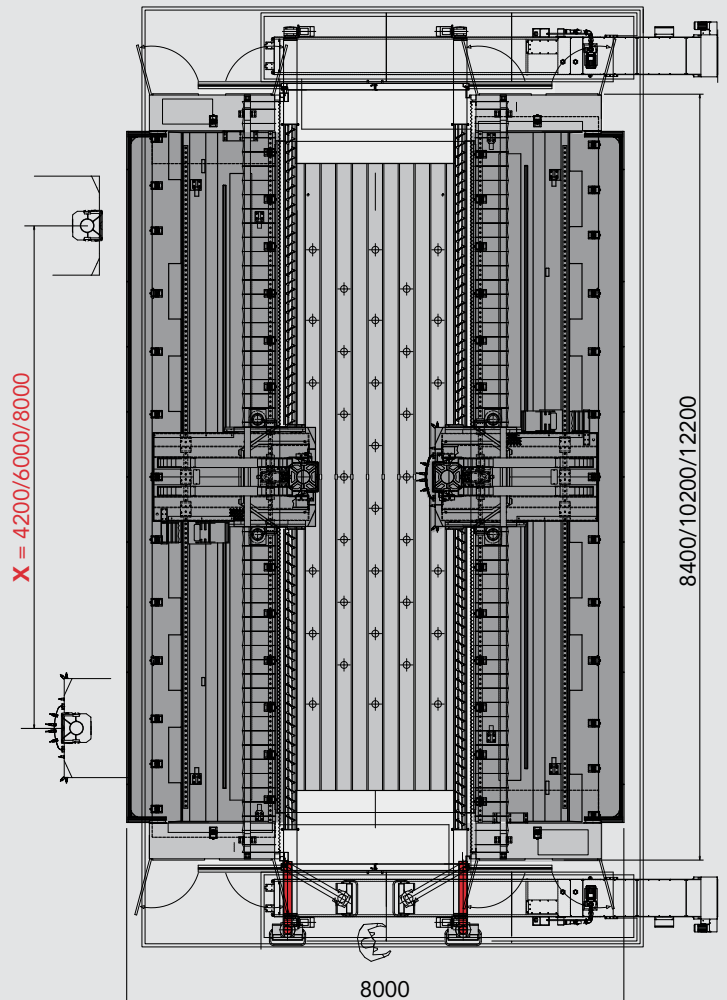
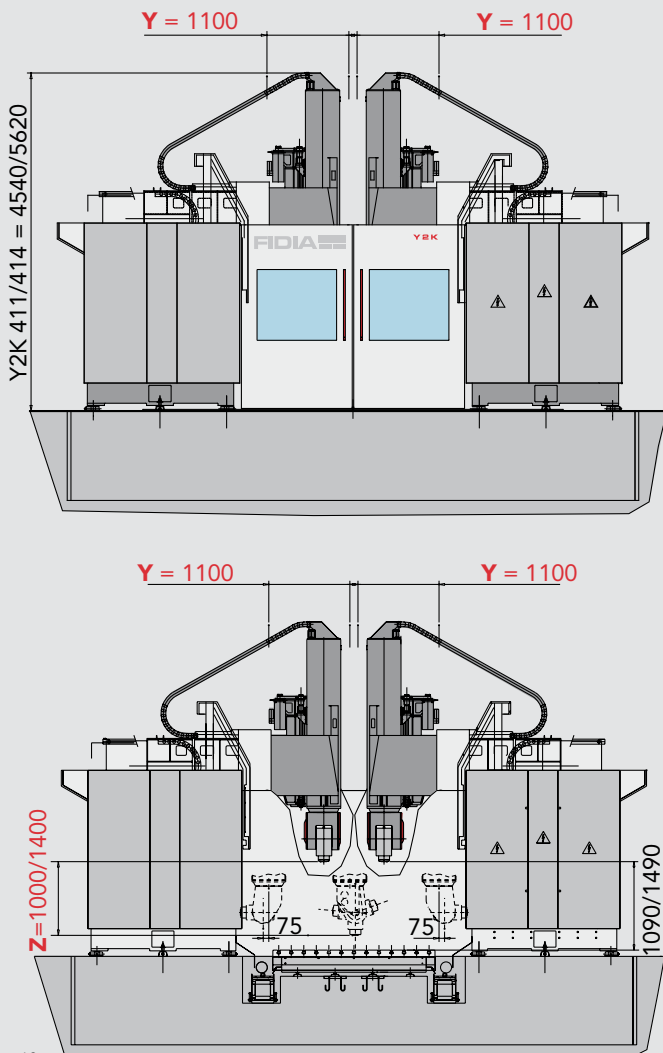


## Y2K

Fidia's experience as a unique supplier of global solutions has made this special configuration possible. It consists in the combination of two K411/414 basic systems sharing the same work-piece table. Productivity is therefore doubled compared to a traditional portal machine.

Furthermore, the extremely flexible software gives excellent results when machining dies, large dimensioned single components or when directly approaching separate pieces. This is achieved thanks to the fact that the 2 NCs allow for independent and different milling part-programmes ensuring total safety for each machine's working area.

A tool measuring system in common with both sections and a piece alignment device grant a correct synchronism between the machines allowing for a perfect and constant machining of parts.





Technical data	Y2K4	Y2K6	Y2K8
<b>Linear axis travel</b>			
X (*)	4200 mm (165")	6000 mm (236")	8000 mm (315")
Y (*)	2200 mm (87")		
Z	1000/1400 mm (39"/55")		
<b>Linear axis speed</b>			
X	24 m/min (944.8 ipm)	30 m/min (1181 ipm)	30 m/min (1181 ipm)
Y Z		24 m/min (944.8 ipm)	24 m/min (944.8 ipm)
<b>Positioning accuracy</b>			
X	± 0,0075 mm (±.0003")	± 0,010 mm (±.0004")	± 0,0125 mm (±.0005")
Y Z	±0,005 ±0,004 mm (±.0002" ±.00015")		
<b>Work-piece table:</b>			
dimensions	5000 x 2200 mm (197" x 87")	7000 x 2200 mm (275.5" x 87")	9000 x 2200 mm (354" x 87")
T-Slots	n° 9 pitch 250 mm (10")		
loading capacity	9000 kg/m <sup>2</sup> (1843 lbs/ft <sup>2</sup> )		
<b>Tool magazine</b>			
No of positions	2 x 42 - 2 x 84		
<b>Weight</b>			
	64000 kg (13108 lbs)	76000 kg (15566 lbs)	88000 kg (18024 lbs)

(\*) +150 mm (6") rotating the C axis with vertical spindle



**FIDIA S.p.A.**

Corso Lombardia, 11  
10099 San Mauro Torinese - TO - ITALY  
Tel. +39 011 2227111  
Fax +39 011 2238202  
info@fidia.it  
www.fidia.com

**FIDIA GmbH**

Robert-Bosch-Strasse 18  
63303 Dreieich-Sprendlingen - GERMANY  
Tel. +49 6103 4858700  
Fax +49 6103 4858777  
info@fidia.de

**FIDIA Sarl**

47 bis, Avenue de l'Europe  
B.P. 3 - Emerainville  
77313 Marne La Vallée Cedex 2 - FRANCE  
Tel. +33 1 64616824  
Fax +33 1 64616794  
info@fidia.fr

**FIDIA Iberica S.A.**

Parque Tecnológico de Zamudio  
Edificio 208 - 48170 Zamudio - Bilbao - SPAIN  
Tel. +34 94 4209820  
Fax +34 94 4209825  
info@fidia.es

**OOO FIDIA**

24/27, Sadovaya Samotechnaya str.  
127051, Moscow - RUSSIA  
Tel: +7 (495) 792 52 45  
Fax: +7 (495) 792 52 47

**FIDIA Sp. z o.o.**

ul. Pradzynskiego 12/14  
01-222 Warszawa - POLAND  
tel./fax: +48 22 256 73 74  
mobile: +48 601 486 789  
info@fidia.pl

**FIDIA Co.**

1397 Piedmont, Suite 800  
Troy - Michigan 48083 - USA  
Tel. +1 248 6800700  
Fax +1 248 6800135  
info@fidia.com

**FIDIA DO BRASIL LTDA**

Av. Salim Farah Maluf, 4.236 - 3º andar  
Móoca - SÃO PAULO - Cep 03194-010 - BRAZIL  
Tel. +55 11 29657600  
Fax +55 11 20212718  
info@fidia.com.br

**FIDIA INDIA PRIVATE LTD**

H Block, Plot No. C-181  
M.I.D.C. Chinchwad,  
PUNE - 411019 - INDIA

**FIDIA JVE**

Beijing Fidia Machinery & Electronics Co., Ltd  
Room 1509, 15/F Tower A. TYG Center Mansion  
C2 North Road East Third Ring Road,  
Chaoyang District  
100027 BEIJING - P.R. CHINA  
Tel. +86 10 64605813/4/5  
Fax +86 10 64605812  
info@fidia.com.cn

**FIDIA JVE**

Shanghai Office  
28/D, No.1076, Jiangning Road  
Putuo District  
Shanghai 200060 - CHINA  
Tel. +86 21 52521635  
Fax +86 21 62760873  
shanghai@fidia.com.cn

**Service centres:****FIDIA GmbH - SERVICE CZ**

CZ- 74706 Opava  
Tel/Fax +420 553 654 402  
j.vecerek@fidia.de

**3H MAKINA**

Atasehir Bulvari, Ata 2/3  
Plaza, Kat: 9 No: 80  
Atasehir - Istanbul - TURKEY  
Tel.: +90 216 456 10 43  
Fax: +90 216 456 75 23  
ekosova@3hlttd.com

**P.V. ELECTRONIC SERVICES C.C.**

P.O. Box 96  
Hunters Retreat 6017  
Port Elisabeth SOUTH AFRICA  
Tel. +27 41 3715143  
Fax +27 41 3715143  
pvanek@sancelink.co.za

**AXIS SYSTEMS**

Flat No.9, Building No.13,  
Shraddha Garden, Chinchwad  
Pune 411033 - INDIA  
Cell. +91 9881245460  
Telefax +91 20 27656682  
panks@axis-fidia.in

**SHIYAN FIDIA SERVICE CENTRE**

N.84 Dong Yue Road,  
Shiyan, Hubei - CHINA  
Tel. +86 719 8225781  
Fax +86 719 8228241

**CHENGDU FIDIA SERVICE CENTRE**

Huang Tian Ba  
Chengdu, Sichuan - CHINA  
Tel. +86 28 87406091  
Fax +86 28 87406091

**H&H Machine Tools Australia Pty. Ltd.**

45 Fordson Road  
Campbellfield (Melbourne), VIC 3061  
AUSTRALIA  
Tel: +61 3 9357 2368  
Fax: +61 3 9359 3887  
thegmann@h-h.com.au

**IE-MAT s.r.l.**

Bv. De Los Alemanes No. 3387  
5022 Barrio Los Boulevares  
Cordoba - X5022EOF  
ARGENTINA  
Tel. +54 0351 4750483  
Fax +54 0351 4750483  
ie-mat@ie-mat.com.ar

**Manufacturing plants:****FIDIA S.p.A.**

Via Valpellice, 67/A  
10060 San Secondo di Pinerolo  
TO - ITALY  
Tel. +39 0121 500676  
Fax +39 0121 501273

**FIDIA S.p.A.**

Via Gorizia, 162  
47100 Forlì  
ITALY  
Tel. +39 0543 770511  
Fax +39 0543 795573  
info@meccanicacortini.it

**SHENYANG FIDIA NC & MACHINE CO., LTD.**

No. 1 17 Jia Kaifa Rd.  
Shenyang Economic & Technological Development Zone  
110141 Shenyang - P.R. CHINA  
Tel. +86 24 25191218/9  
Fax +86 24 25191217  
info@fidia.com.cn

**Research centres:****FIDIA S.p.A.**

c/o Tecnopolis  
Str. Provinciale per Casamassima Km 3,  
70010 Valenzano  
Bari - ITALY  
Tel. +39 080 4673862

**SHENYANG FIDIA NC & MACHINE CO., LTD.**

5th Floor, South Administrative building,  
Tongji University,  
n.4800 Capo An Road. Jiading District,  
201804 Shanghai - CHINA  
Tel. +86 21 69585811  
Fax. +86 21 69585822



SAIGLOBAL company  
Sistema Qualità Certificato  
UNI EN ISO 9001 : 2008  
Art. n. SGG 19C