

# Product Range

**PIETRO CARNAGHI**  
Machine Tools



Italian Prime Minister visits Pietro Carnaghi to see the biggest Gantry Milling Machine in the world (UNIMILL 140)

PIETRO CARNAGHI Company, founded in 1922, is today an important reference point in the field of machine tools, thanks to its continuous and constant development of technologies and projects, supported by over 90 years of experience and with more than 1000 machines installed all over the world. The quality of the Company is certified by UNI EN ISO 9001:2000, the annual production capacity is around 40 machines. Furthermore a D&B RATING I, certifies its maximum financial reliability.

PIETRO CARNAGHI is world leader in the production of:

- Turning and Milling Vertical Lathes, table dia. From 800 to 10000 mm, height 9500 mm
- Movable portals milling machines (Gantry type)
- Flexible Manufacturing Systems (FMS), cells

The headquarter, located in Villa Cortese (Milano) is equipped with climatized sheds with a height capacity of 20 meters, 150 ton cranes, and it reaches a total covered area of over 50.000 square meters.

PIETRO CARNAGHI has the unique peculiarity to design, to entirely work the components and to wholly assembly its machines, in this way the absolute excellence is granted. PIETRO CARNAGHI has implemented a Global Service which offers an important process technological support for complete turnkey solutions; this is essential for the resolution of all the customers' production problems.

Other sale and service dislocated units are:

- PIETRO CARNAGHI GMBH Germany
- PIETRO CARNAGHI USA INC
- PIETRO CARNAGHI TRADING CO. LTD. in China

The main application fields of PIETRO CARNAGHI machines are:

- Aeronautics, Aero engines
- Aerospace
- Energy: gas, steam and hydro electrical turbines machining; nuclear energy; wind energy
- Earth moving machines
- Bearings
- General machining

Relevant installations are located worldwide in the most prestigious Company: Europe, USA, China, Russia, Middle East and Latin America.



### Financial Stability

PIETRO CARNAGHI SPA obtained the D&B Rating I, the max level of reliability in a business relation BtoB.



### Top quality

Recognized since 1922 Pietro Carnaghi obtained the UNI EN ISO 9001:2000 for design, production, installation and service after sale of vertical lathes, grinders Vertical CNC machines, milling machines, mobile gantry and mobile banking.



### Made in Europe

100% Italian private property corporation, with the support of one of the highest technological districts in Europe, North Italian Style. Cooperation with UNIVERSITY Milano – Politecnico Aachen University - Germany



### Global Service

24 hours service available, 4 branches worldwide, commitment to customer support.



### Italian Design

100% Italian private property corporation, with the support of one of the highest technological districts in Europe, North Italian Style.



# PIETRO CARNAGHI

Machine Tools

Since 1922 ...years  
of productions



Thousands of

**PIETRO CARNAGHI** machines cutting chips...



Hundreds of people working for customer satisfaction  
4 main headquarters in the world (Italy, Germany, USA, China)  
24 hours intervention, Global Service  
1 Unique Dedication to Quality



# Key Features



## Hydrostatic axis

All the axis of Pietro Carnaghi machines are hydrostatic:  
No metal to metal contact, to nullify wear, to reduce force dispersion, to absorb vibrations:  
- infinite bearing life  
- improved crash protection  
- superior damping



## Rigid hirth coupling

Most rigid and reliable connection between RAM and accessories, 4 micron repeatability, superior clamping force.



## Perfect mechanical coupling

All machine structures machined in-house in Pietro Carnaghi, with all mechanical coupling optimized in order to avoid machine instability in the years.



## High rigidity structures

Over dimensioned structures to ensure the maximum performance in the years



## Thermal control

the thermal control is managed providing thermostabilized and thermo-symmetric structures, with minimal impact on machining



## Direct drive

Turning and milling in one solution. Direct drive system allow to pass from turning to milling operation directly.

Quality of motion:  
less vibration, lower noise and maximum quality of machining.  
Efficiency  
Reliability

The direct drive system replaces a complex kinematic chain with two solid-state components (rotor and stator) operating without contact, are not subject to mechanical wear and are maintenance free.

Performance and stability over time.



## KPI live control

Key parameter indicator: the machine is able to read live and record all the major kpi related to its status. Will be then available for download or directly read through a direct connection with the cnc of the machine.



## High machine dynamic

Direct drive, high rapid movement and high acceleration of the axis allow the operator to machine with the newest technological technique, like trochoidal approach, high feed application. Special solution can be applied also in turning (eccentric, offset turning operations).



## Ergonomic comfort

Machines are studied for maximum operator comfort, view, handling and maintenance access.



## Machine adaptive control

System monitors actual cutting conditions in real-time, and automatically adjust the feed rate to its optimal level during each operation.



## Machine self tuning

Machine self geometrical tuning in relation to delta temperature reading.



## Automatic tool & accessory change

Complete availability of hundreds types of accessories and up to thousands of tools.



## Smart production scheduler

Pietro Carnaghi FMS are equipped with a production software that is studied to optimize the scheduling of part programs, tool management, part probing, calibrations and feeding in the workpieces.



## Integrated presetting unit

Tools, milling and turning ones, can be directly presetted in the machine, in order to guarantee the highest performance in terms of accuracy.



## In process measuring

Complete availability for machine geometrical in process check, ultrasonic probes for thickness check.



## Low power consumption

With the aim to decrease energy consumption, PIETRO CARNAGHI has implemented several features, to reduce unnecessary machine activities, with idle cycles and the "Smart Automatic Shutdown Machine" function.



## Low maintenance

PIETRO CARNAGHI machine price + average maintenance cost in 10 years is lower than traditional machines price + 10 years maintenance costs.



## Extreme accuracy package

Special machine design to reduce geometrical, axes positioning and angular deviation tolerances (ref to ISO230-DIN 8609 /VDI 3441) to guarantee the best quality parts.  
Pitch, Yaw and Roll (on full axis travel of working area)= 6 arcs



## Customized table design

Special table design can be applied according to the different customer needs. High removal rate and consequentially high chip evacuation are always taken in consideration, with a dedicated special design.



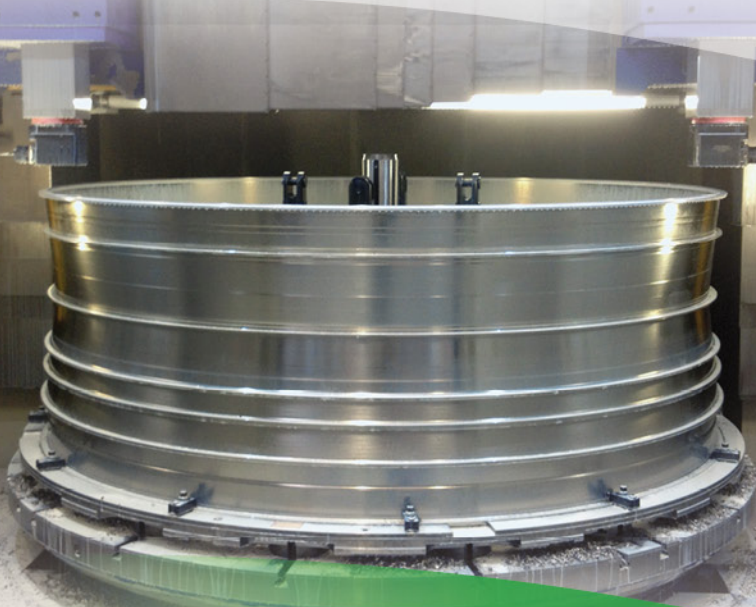
## FEM Analysis

Machine structures are designed using Finite Element Method, subdividing the components in small finite units and using most advanced calculus of variations in order to optimize structures behaviour during machining.



## Anticollision system

Simulation system with virtual machining process check to avoid collisions.

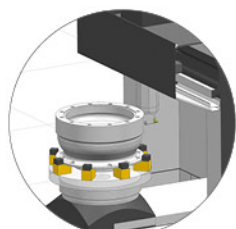


- Hydrostatic axis with high static and dynamic axis stability
- high acceleration + axis speed up to 40 m/min
- Direct Drive Spindle
- Vertical RAM with octagonal shape, C axis integrated, direct drive: 6000 rpm at 939 Nm
- Unique design for limited floor space
- One compact structure with movable Y axis table integrated
- Different heads for different milling/drilling/turning ops.
- Rigid and precise HIRTH coupling connection between accessory and RAM (5 micron repeatability)

Hydrostatic multitasking vertical lathe 5 Axis milling capability.



Extreme compact design



Fully rigid turning feature with z axis extension



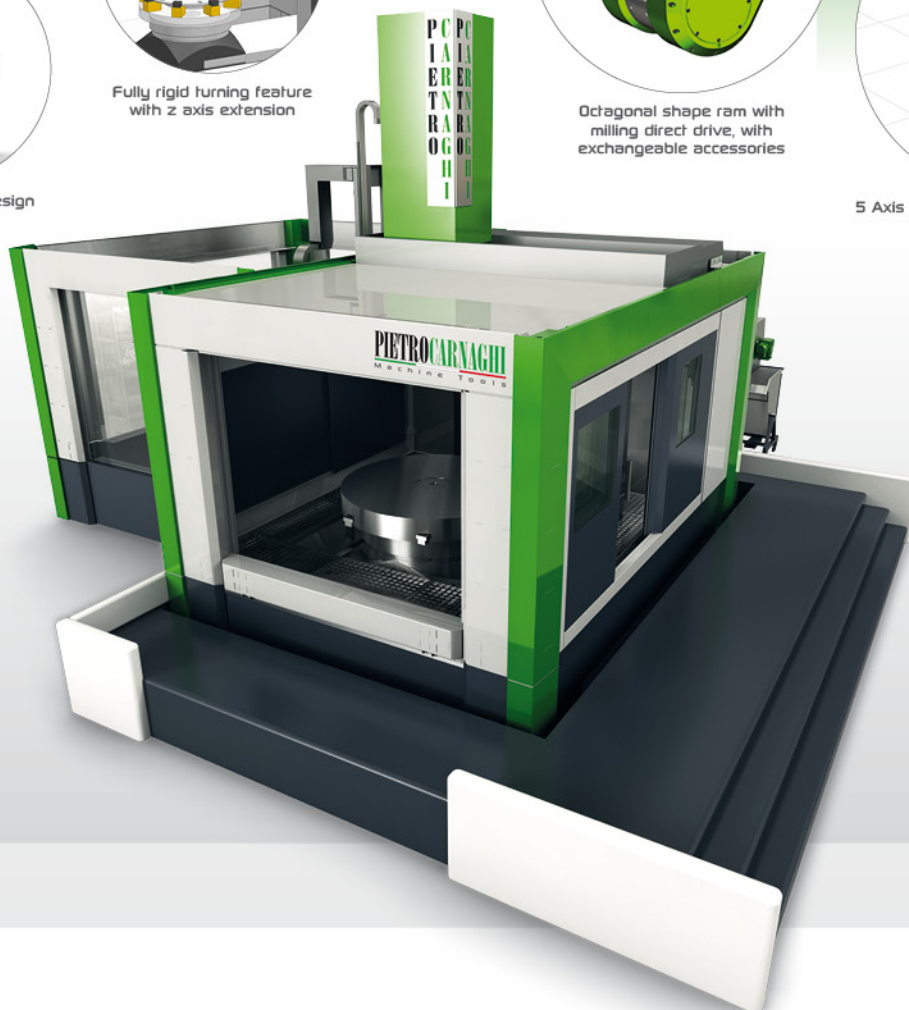
Octagonal shape ram with milling direct drive, with exchangeable accessories



5 Axis machining with 6000 rpm, wide angle universal heads



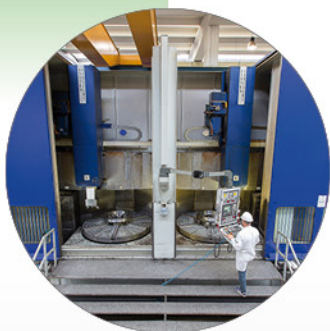
Integrated Y Axis



Direct drive

TYPE OF MACHINE		FLEXTURN 15	FLEXTURN 25	FLEXTURN 25 W
Turning Platform	mm	800 / 1000 / 1200	1600 / 1800 / 2000	
Turning / Swing	mm	1500	2500	
Milling Square	mm	1300 X 1300	2100 X 2100	
Max. Weight - no APC (APC)	ton	6 (4)	10 (7)	
Turning Power	kW	60		
Turning Speed	rpm	800 / 600 / 500	400 / 350 / 300	
Turning Torque	KNm	7	20	
Turning Height	mm	1100 (1400)	1100 (1400)	1400 (1700/2000)
OCTAGON RAM section	mm	400		
Z Axis stroke (RAM)	mm	1100 (1400)		
X Axis stroke (Carriage)	mm	1300	2100	
Y Axis stroke (Table Saddle)	mm	1600 (+1550/-50)	2100 (+2050/-50)	
W Axis stroke (Crossrail - continuous clamping position)	mm	---	---	400 (700/1000)
Milling Power	kW	30		
Milling Speed	rpm	6000 - 10000 HS		
Milling Torque	Nm	939		

- Hydrostatic axis with high static and dynamic stability
- Turning and milling operations on one machine
- Unique Double Direct drive table with high torque/table speed
- High rigidity structure with two table spindles design, 2 separate working areas, 1 auxiliary equipment box
- Unique design for limited floor space, high productive solution
- Two ram carriages, one per each working area = 1 operator for 2 pieces
- Extreme cutting performances up to 100 kW
- Optional Workpiece Handling System (designed for 2 set up components)
- Long-lasting reliability
- Rigid and precise HIRTH coupling connection between accessory and RAM (18 ton clamping force; 5 micron repeatability)



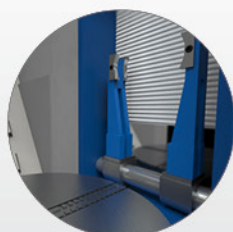
One Operator for 2 components



Version with Turret



Version with RAM carriage



Workpiece Handling System



Optimal footprint for intensive production



Direct drive

T = Turning capability / TM = Turning and milling capability

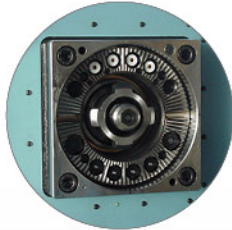
TYPE OF MACHINE		ATT8	ATT10	ATT12		ATT14	
Max turning diameter	mm	800	1000	1200		1400	
Motor type		direct drive					
Table diameter	mm	800	800/1000	1000		1200	
Turning power	kW	60	60	60	100	60	100
Table RPM	rpm	800	800	800	800	650	650
Torque	KNm	7	7	7	10	7	10
C axis: rpm	rpm	20	20	20	20	20	20
C axis: torque	KNm	7	7	7	10	7	10
Table loading weight	t	12					
Ram section	mm	250x250					
Z axis stroke	mm	UPTO 1800					
Milling power	kW	41					
Torque	Nm	1500					
Milling RPM	rpm	3000 / op 6000 / 10000 HS					
Rapid axis feedrate X/Z	mm/min	30.000					



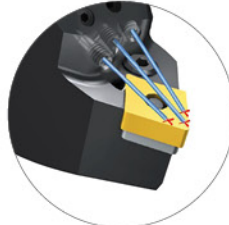
# VERTICAL LATHES - COMPACT DESIGN SINGLE FRAME

# ATF SERIES

- Complete turning, milling and grinding of complex components in a single setup
- Hydrostatic axis with high static and dynamic stability
- Unique Double Direct drive table high torque/speeds
- High rigidity structure with design for limited floor space
- Extreme cutting performances up to 100 kW
- Long-lasting reliability
- Ultra High-Pressure coolant pack (350 bar) for machining titanium and superalloys
- higher flexibility : pallet change systems and several accessories heads -optional Y-axis
- Complete turnkey for machining aerospace components (configurations, special tools, process)
- Available with twin mirror rams for maximum cutting performance
- Rigid and precise HIRTH coupling connection between accessory and RAM (18 ton clamping force; 5 micron repeatability)



HIRTH coupling



Ultra High Pressure coolant 350 bar available



Internal Enclosure washing system



Full enclosure available



Pallet systems



Extra platform for Auxiliary Equipment



Compact optimized massive structure for accuracy and rigidity



Direct drive

T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		ATF8	ATF10	ATF12	ATF14		
Max turning diameter	mm	800	1000	1200	1400		
Motor type		direct drive					
Table diameter	mm	800	800/1000	1000	1200		
Turning power	kW	60	60	60	100	60	100
Table RPM	rpm	800	800	800	800	650	650
Torque	KNm	7	7	7	10	7	10
C axis: rpm	rpm	20	20	20	20	20	20
C axis: torque	KNm	7	7	7	10	7	10
Table loading weight	t	12					
Pallet loading weight	t	10					
Ram section	mm	250x250					
Z axis stroke	mm	UPTO 1800					
Milling power	kW	41					
Torque	Nm	1500					
Milling RPM	rpm	3000 / op 6000 / 10000 HS					
Rapid axis feedrate X/Z	mm/min	30.000					

- single column design with extraordinarily rigid and stable machine frame for high rigidity
- Hydrostatic axis with high static and dynamic stability
- Unique Double Direct drive table high torque/speeds
- Extreme cutting performances with long-lasting reliability with damp vibrations for maximum accurate cutting
- High level of bending and torsion rigidity
- Generously proportioned principal components with high thermo-stability with high geometric precision
- Full travel range in the X-axis in both directions from the table center (for machining and measuring)
- Customized machine designs
- Fully enclosed machining area
- Available with twin rams for maximum cutting performance
- Rigid and precise HIRTH coupling connection between accessory and RAM (18 ton clamping force; 5 micron repeatability)



Complete Enclosure Available



Additional measuring ram



Different table bearings for different applications



Double ram



Movable Platform for operator in machining area available



Direct drive

T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		AC 16		AC 20		AC 24		AC 28		AC 32	
Max turning diameter	mm	1600		2000		2400		2800		3200	
Motor		direct drive									
Table diameter	mm	1250 / 1400		1600 / 1800		2000 / 2200		2200 / 2500		2800 / 3000	
Turning power	kW	60	100	60	100	60	100	60	100	60	100
Table RPM	rpm	400	400	400	400	275	275	225	225	200	200
Torque	KNm	22,5	28,8	22,5	28,8	28,8	47,5	37	50,5	35	50,5
C axis: rpm	rpm	20	20	20	20	20	20	10	10	20	20
C axis: torque	KNm	22,5	28,8	22,5	28,8	28,8	47,5	37	50,5	35	50,5
Table loading weight	t	12		15		20		30		35	
Pallet loading weight	t	10				17		25		25	
Ram section	mm	250x250		250x250 / 300x300							
Z axis stroke	mm	UPTO 1800		up to 1800 / 2000							
Milling power	kW	41		41 / 44							
Torque	Nm	1500		1500 / 2400							
Milling RPM	rpm	3000 / op 6000 / 10000 HS		3000 / op 6000 / 10000 HS							
Rapid axis feedrate X/Z	mm/min	30000		30.000							
Rapid axis feedrate Y	mm/min	20000		20.000							

# VERTICAL LATHES - DOUBLE COLUMNS DESIGN

# AC BIMO SERIES

The double column closed portal construction provides high machining accuracy, with a long service life.

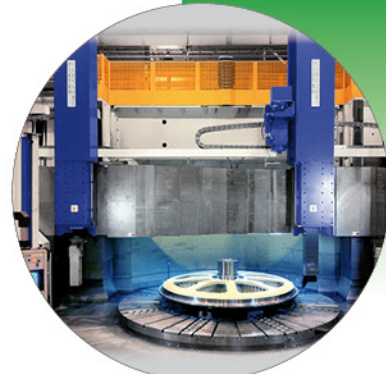
- Generously proportioned principal components with mechanical and hydraulic compensation system
- Extreme cutting performances with long-lasting reliability
- hydrostatic guide rails damp vibrations for maximum accurate cutting, with high static and dynamic stability
- High level of bending and torsion rigidity
- High thermo-stability with high geometric precision
- Full travel range in the X-axis in both directions from the table center (for machining and measuring)
- Customized machine designs to customers' requirements
- Available with twin rams for maximum cutting performance
- Table bearing – optionally hydrostatic system / bearing
- Rigid and precise HIRTH coupling connection between accessory and RAM (18 ton up to 45 ton clamping force; 5 micron repeatability)



Double motor Full C axis



Horizontal side ram available



Available with twin rams for maximum cutting performance



Internal enclosure in stainless steel available



Operator elevator



T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE	AC 36	AC42	AC46	AC52	AC62	AC65	AC70
Max turning diameter mm	3600	4200	4600	5200	6200	6500	7000
Motor	double motor						
Table diameter mm	3000 / 3200	3500 / 4000	4000	4500	5000 / 5500	6000	6000 / 6500
Turning power kW	2x30 2x60	2x60 2x92	2x60 2x92	2x60 2x92	2x60 2x92	2x60 2x92 2x150	2x60 2x92 2x150
Table RPM rpm	150 150	120 120	100 100	100 100	75 75	60 60 60	60 60 60
Torque KNm	55 135	178 178	178 196	178 196	220 279	284 360 570,0	284 360 570
C axis: rpm rpm	20 20	20 20	20 20	20 20	20 20	20 20 20	20 20 20
C axis: torque KNm	55 135	178 178	178 196	178 196	220 279	284 360 570	284 360 570
Table loading weight t	40	50	80	80	120	200 / 250HYD	200/250HY
Ram section mm	250x250 / 300x300	250x250 / 300x300 / 350x350		300x300 / 350x350 / 400x400			
Ram stroke: Z axis mm	UPTO 2000	UPTO 2500		UPTO 3200			
Milling power kW	41 / 44	41 / 44 / 44		44 / 58			
Torque Nm	1500/2400	1500 / 2250 / 2400		2400 / 2700			
Milling RPM rpm	3000 / op 6000	3000 / op 6000		3000 / op 6000			
Rapid axis feedrate X/Z mm/min	30.000	15.000		15.000			
Rapid axis feedrate Y mm/min	20.000	10.000		10.000			

# SERIES AP

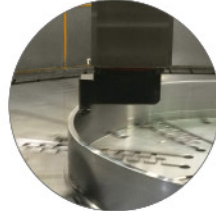
The heavy AP series, double column closed portal construction provides high machining stability, with a long service life. Completely designed for the most severe cutting conditions.

## VERTICAL LATHES - HEAVY STRUCTURE

- Generously proportioned principal components with mechanical and hydraulic compensation system
- New technology for extreme precision C axis control (up to 1,5 arcs)
- Extreme cutting performances with long-lasting reliability
- hydrostatic guide rails damp vibrations for max accurate cutting, with high static and dynamic stability
- High level of bending and torsion rigidity
- High thermo-stability with high geometric precision
- Customized machine designs to customers' requirements
- Available with twin rams for maximum cutting performance
- Extremely rigid table bearing – optionally hydrostatic system / bearing
- High chip removal "Forge Configuration" available
- Rigid and precise HIRTH coupling connection between accessory and RAM (50 ton clamping force; 5 micron repeatability)



Massive RAM 600 x 600 mm



Extreme robust HIRTH coupling for all accessories



Continuous W axis with mechanical locking system for high rigid turning



Smoke aspirator for big size available



Fully controlled operator platform on carriage



TYPE OF MACHINE		AP80	AP90	AP100	AP120	AP130	AP140												
Max turning diameter	mm	8000	9000	10000	12000	13000	14000												
Motor		double motor																	
Table diameter	mm	6000 - 6500		8000	8000	10000	10000												
Turning power	kW	2x60	2x92	2x150	2x60	2x92	2x150												
Table RPM	rpm	60	60	60	50 - 40 HYD			30	30	30	30								
Torque	KNm	284	360	570	320	457	643	320	457	643	320	457	643	606	853	606	853	606	853
C axis: rpm	rpm	20																	
C axis: torque	KNm	284	360	570	320	457	643	320	457	643	320	457	643	606	853	606	853	606	853
Table loading weight	t	200 / 250HYD						300HYD / 500HYD											
Ram section	mm	400x400 / 500x500 / 600x600																	
Ram stroke: Z axis	mm	UPTO 4000																	
Milling power	kW	58 / 81 / 105																	
Torque	Nm	2700 / 3000 / 4000 / 8100																	
Milling RPM	rpm	3000 / 2500 / op 6000																	
Rapid axis feedrate X/Z	mm/min	15.000																	
Rapid axis feedrate Y	mm/min	10.000																	

## MOVABLE TABLE MACHINES

- Generously proportioned principal components with mechanical and hydraulic compensation system , Rigid gantry design
- Linear travelling table (Y-axis) with locking position to turn full power on table centerline
- Additional Y axis feed for turning available (for large high components and large diameters)
- Extreme cutting performances with long-lasting reliability
- hydrostatic guide rails damp vibrations for maximum accurate cutting, with high static and dynamic stability
- High level of bending and torsion rigidity
- High thermo-stability with high geometric precision
- Customized machine designs to customers' requirements
- Table bearing – optionally hydrostatic system / bearing

# AY SERIES

Maximum Flexibility adding a moveable housing bed for table, through the twin columns portal design of the machine, for large components and complete 5 axis milling capability.



Toolholder for Y axis direction turning operations



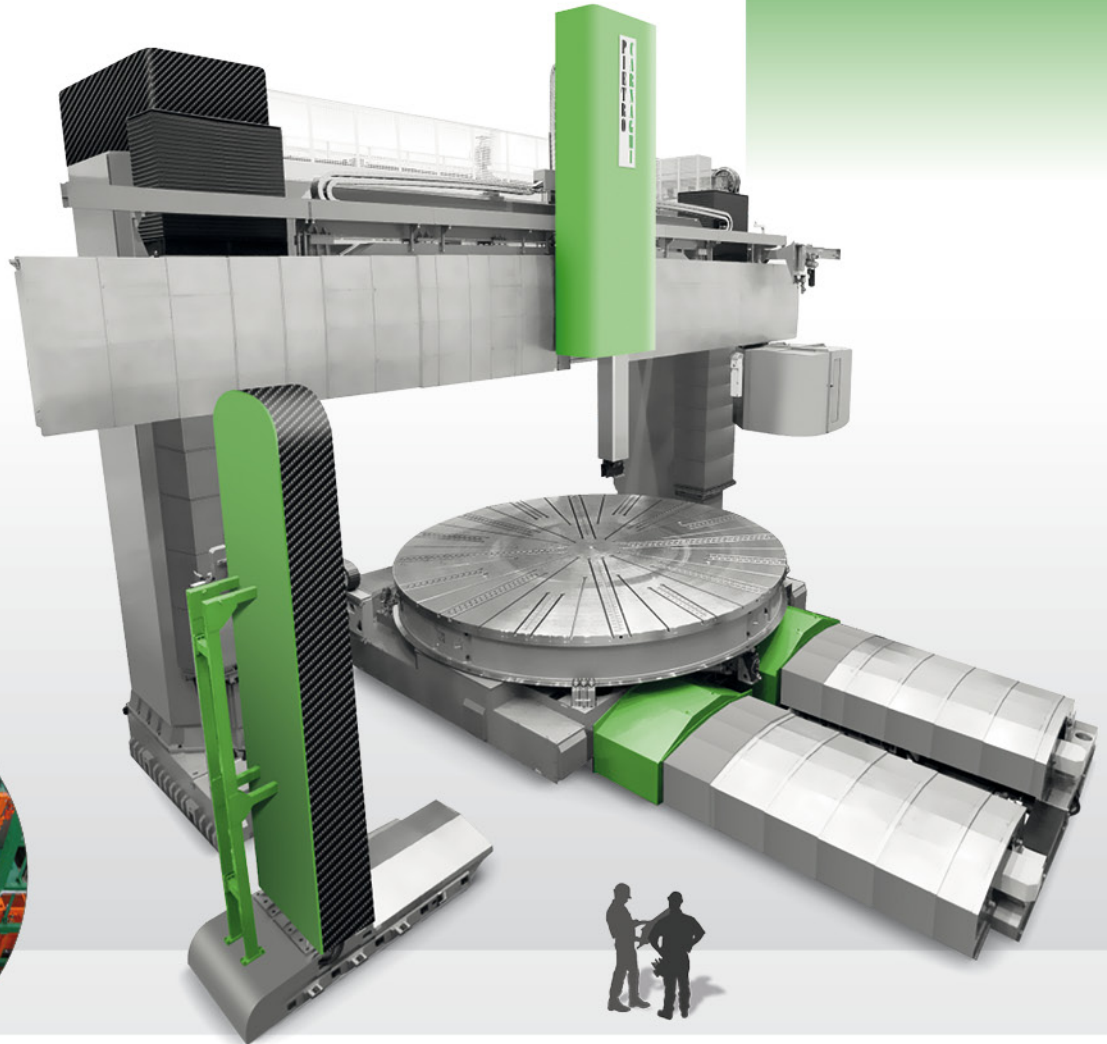
Additional movable table with platform for operator



Optional two table design



Fully controlled operator platform moving on 3 axis



# SERIES AS

Single column design, with optimal structure for big machining, ring/bearings, multi-rigging point components.

## SINGLE COLUMN HEAVY MACHINES

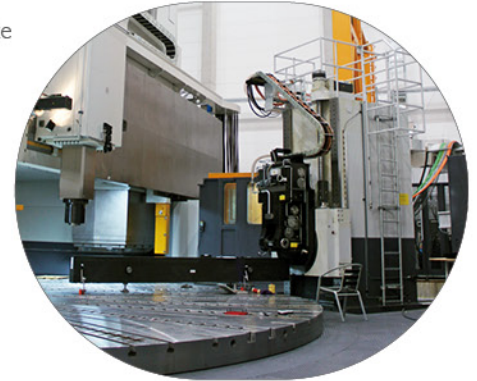
- Generously proportioned principal components with mechanical and hydraulic compensation system
- Extreme cutting performances with long-lasting reliability
- hydrostatic guide rails damp vibrations for maximum accurate cutting, with high static and dynamic stability
- High level of bending and torsion rigidity
- High thermo-stability with high geometric precision
- Table bearing – optionally hydrostatic system / bearing



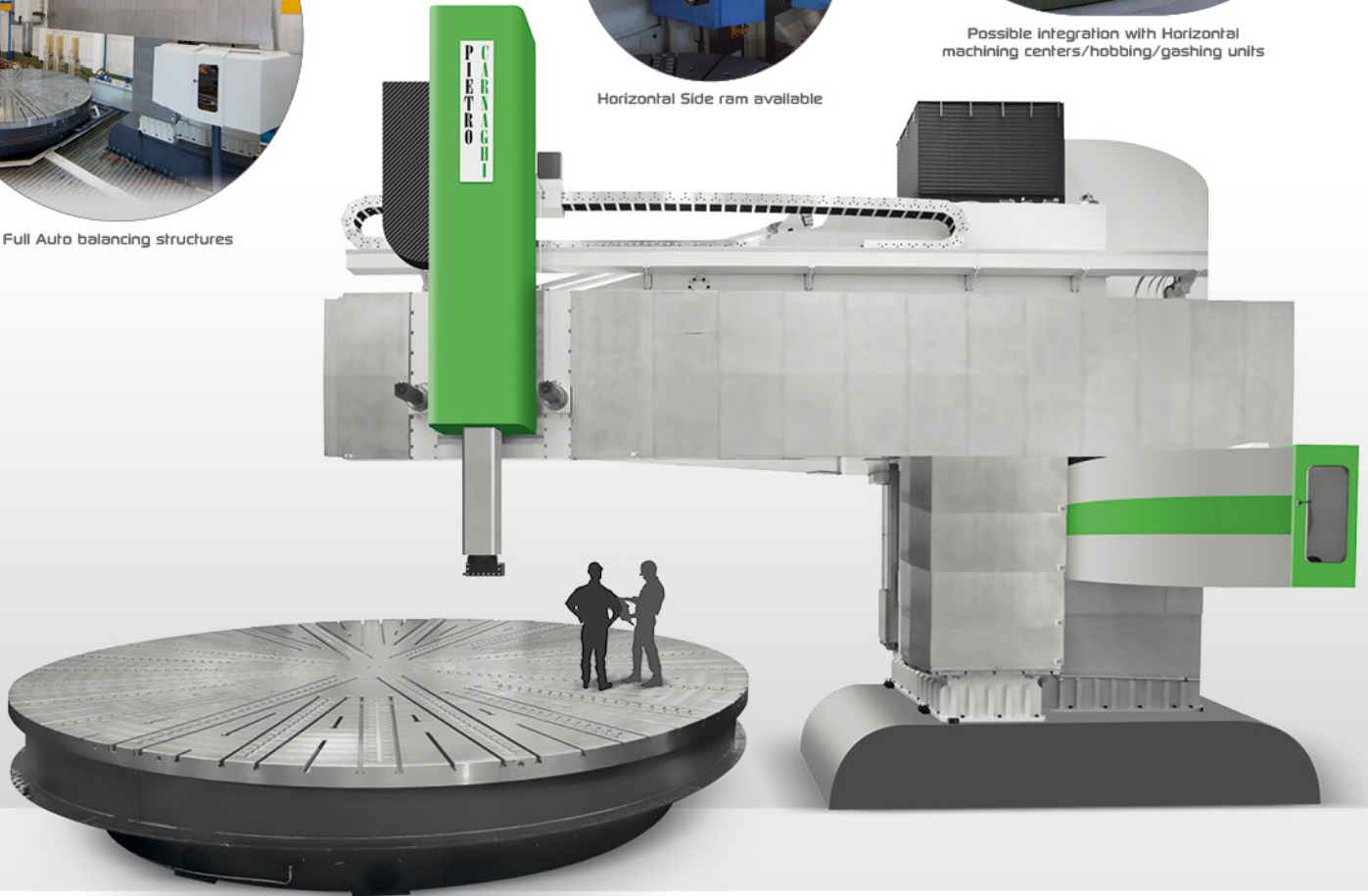
Full Auto balancing structures



Horizontal Side ram available



Possible integration with Horizontal machining centers/hobbing/gashing units

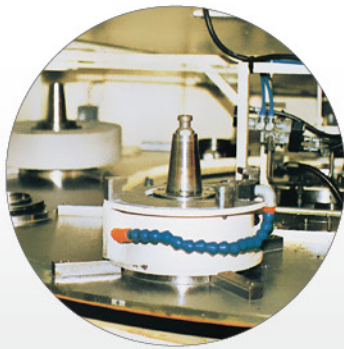


TYPE OF MACHINE	AS65	AS80	AS100	AS120	AS130	AS140	AS160	AS180	
Max turning diameter mm	6500	8000	10000	12000	13000	14000	16000	18000	
Motor	double motor								
Table diameter mm	6000	6000 / 6500	8000	8000	10000	10000	10000	10000	
Turning power kW	2x60	2x92	2x150	2x60	2x92	2x150	2x92	2x150	
Table RPM rpm	60	60	60	50-40 HYD				30	30
Torque KNm	284	360	570	320	457	643	606	853	
C axis: rpm rpm	20	20	20	20	20	20	20	20	
C axis: torque KNm	284	360	570	320	457	643	606	853	
Table loading weight t	200 / 350HYD				300HY / 500HYD				
Ram section mm	400x400 / 500x500 / 600x600								
Ram stroke: Z axis mm	UPTO 4000								
Milling power kW	58 / 81 / 105								
Torque Nm	2700 / 3000 / 4000 / 8100								
Milling RPM rpm	3000 / op 6000								
Rapid axis feedrate X/Z mm/min	15,000								
Rapid axis feedrate Y mm/min	10,000								

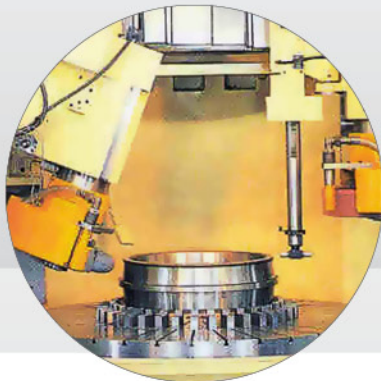
## GRINDING VERTICAL CENTRES

- Hydrostatic axis with high static and dynamic stability
- high precision grinding applications in the bearing and aerospace industries
- Direct drive high table torque/speeds
- Grinding spindle
- Orientation of the CNC-grinding head
- Roller wheel dresser or fixed diamond
- Interpolation also with table movement
- Combination of a grinding head with a turning/milling ram
- Automatic change of the grinding wheels and casings
- Automatic balancing of the grinding wheels
- Magnetic table with demagnetization in and outside the machine

SH  
SERIES



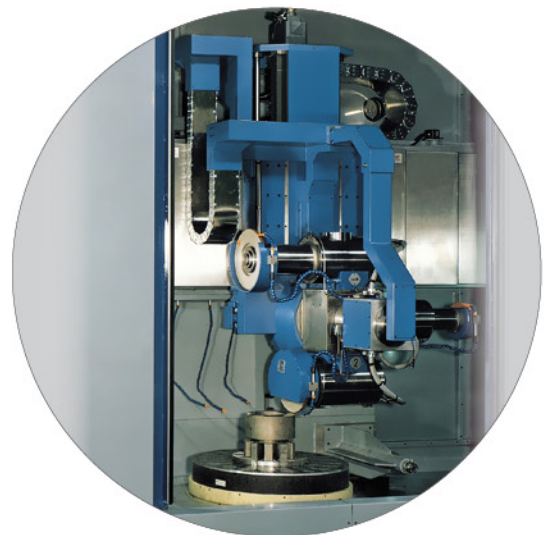
Dressing wheel with automatic change



Measurement of parts in process,  
with dedicated additional ram



Independent grinding carriage  
(to be added to turning carriage)



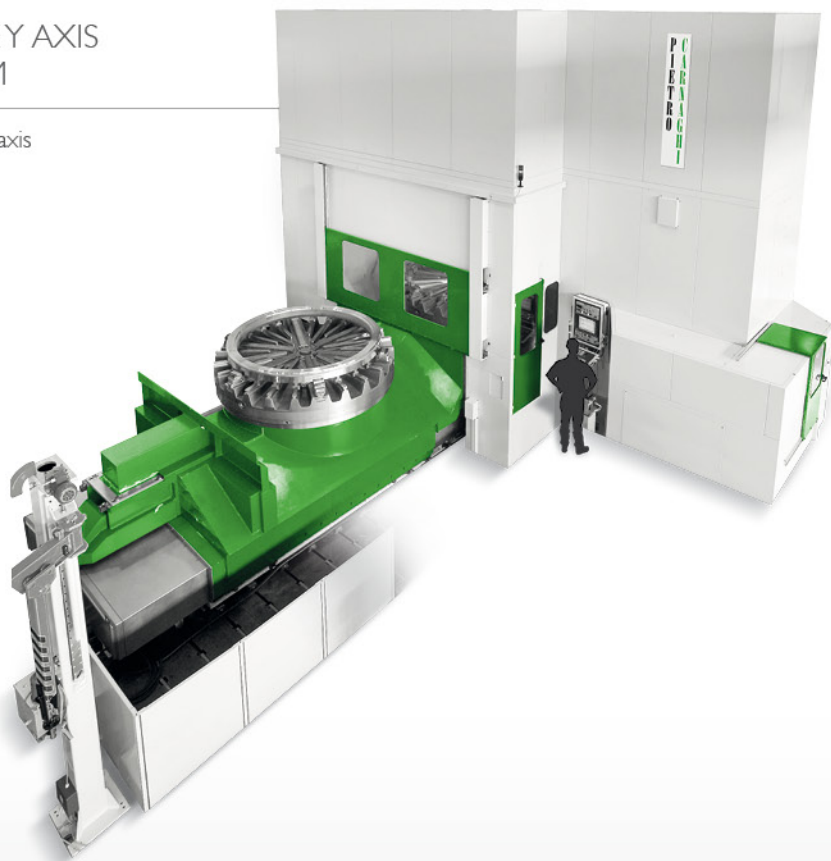
Multiple Grinding Electro spindle Heads



# PALLET SYSTEMS

## DOUBLE TABLE Y AXIS PALLET SYSTEM

With fully operation Y axis

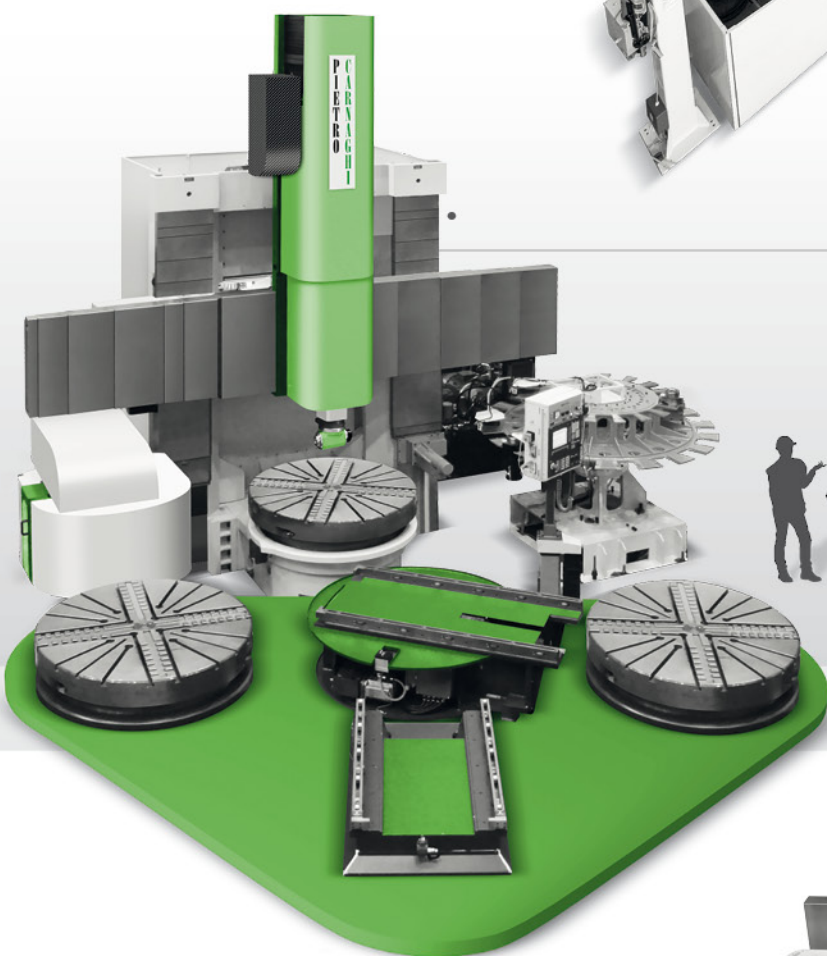


## TRANSLATING PALLET SYSTEM

The translating pallet system for work-piece changing through pallets consists, in the base version, of:

- External RPS rotary station for workpiece loading, unloading and centering.
- SPS: waiting station for pallets
- RSU rotary pallet loader equipped with pallet handling system

Extra precise centering system 5 micron repeatability and radial and axial runout < 10 micron



## ROTATING PALLET SYSTEM

DOUBLE PALLET ROTATING SYSTEM (0°-180°)

Extra precise centering system 5 micron repeatability and radial and axial runout < 10 micron





# GANTRY MILLING MACHINES - HEAVY STRUCTURE

**UNIMILL**

- Generously proportioned principal components with mechanical and hydraulic compensation system
- hydrostatic guide rails damp vibrations for max accurate cutting, with high static and dynamic axis stability
- High level of bending and torsion rigidity
- High thermo-stability with high geometric precision
- Forged steel Ram with Direct Drive Motor and Fully Integrated C axis or traditional gearbox version
- Optional Turning table for extreme cutting performances with long-lasting reliability
- Different Machining Area (Pendulum Machining)
- RAM with enhanced helix angle system



Direct Drive milling spindle with integrated C axis, Square or Octogonal shape



Optional turning table



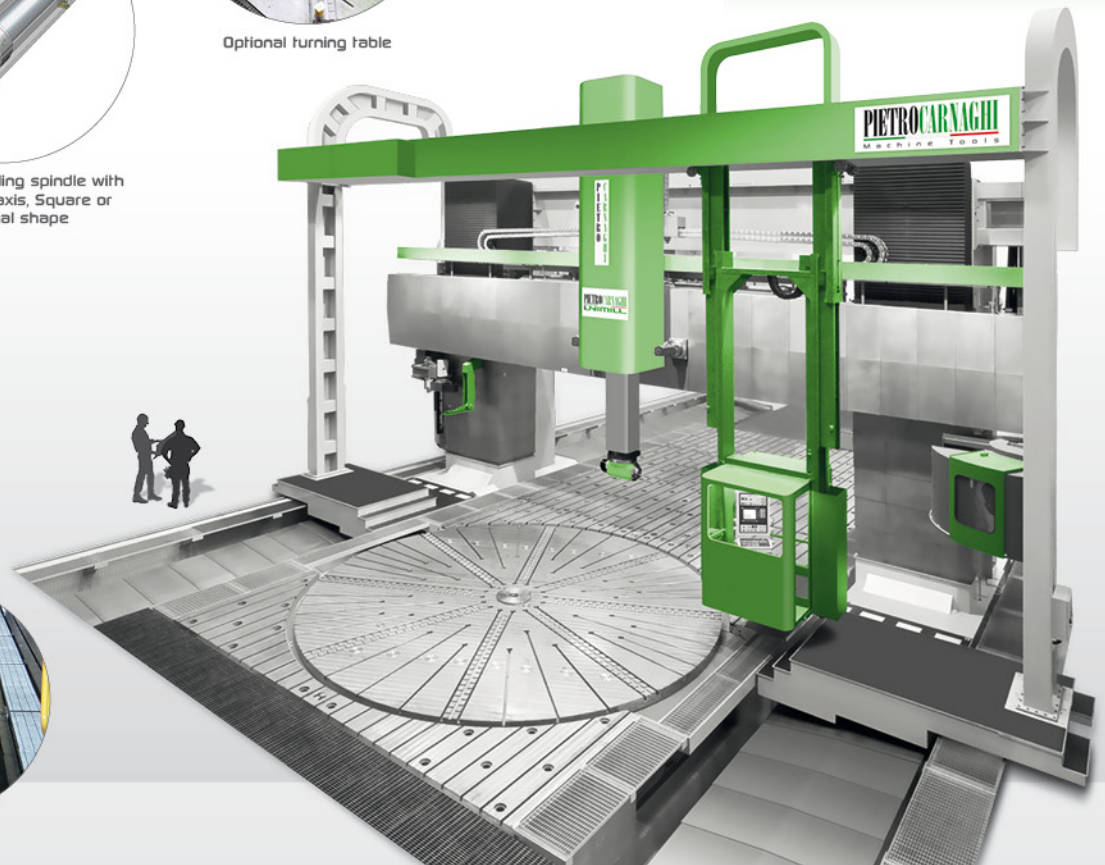
Separate Bridge with fully movable operator platform in machining area



Fully Automatic accessory change and travelling robot for tools

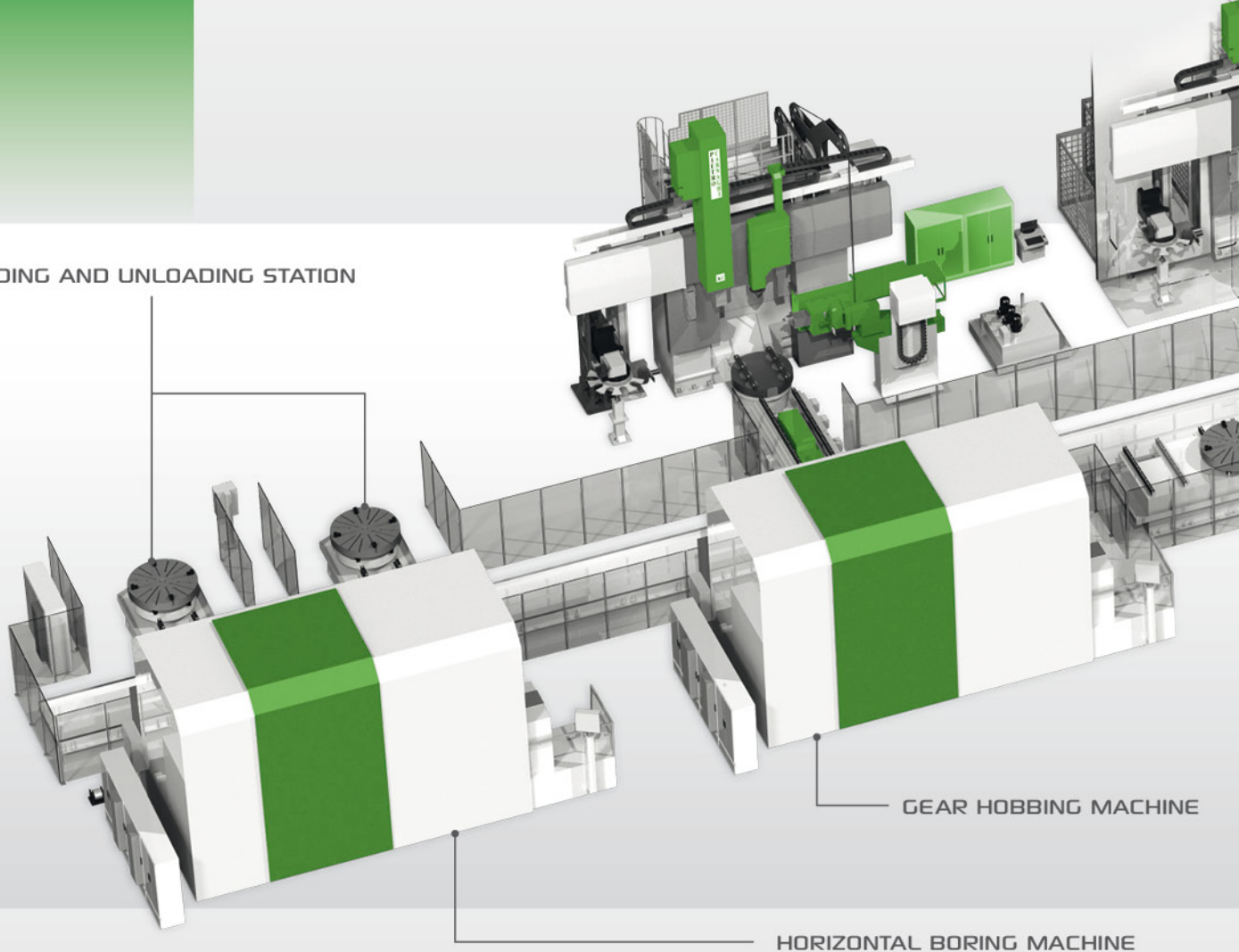


Automatic telescopic walkable bridge for operator operations



TYPE OF MACHINE		UNIMILL 40	UNIMILL 50	UNIMILL 60	UNIMILL 70	UNIMILL 80	UNIMILL 90	UNIMILL 100	UNIMILL 110	UNIMILL 120	UNIMILL 130	UNIMILL 140	
Distance between the columns	mm	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	
Table width	mm	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000		
Milling height with vertical head: fixed crossrail	mm	1500 - 2000 - 2500											
Milling height with vertical head: movable crossrail	mm	3000 - 3500 - 4000 - 5000 - 6000 - 7000 - 8000											
Ram stroke Z axis	mm	up to 4000											
Ram section	mm	500 x 500 - 600 x 600											
Milling power	kW	75 - 100 - 125											
Milling torque	Nm	upto 10.000											
Max. RPM	rpm	2500 - 4000											
Rapid feed X,Y and Z	mm/min	25000						10000					
Turning table diameter (option)	mm	3000	4000	5000	6000	8000			10000				

LOADING AND UNLOADING STATION



GEAR HOBBIING MACHINE

HORIZONTAL BORING MACHINE

## FLEXIBLE MANUFACTURING SYSTEMS

The systems integrate multiple live spindle vertical lathes with hobbing and shaping machines, horizontal boring machines and additional operation systems, like surface laser robot heat treatment, etc.

The high machine accuracy along with the interchangeable turning and milling heads has eliminated the need for multiple set-ups on various types of machine tools. The critical part features are produced in fewer setups on the vertical lathes insuring consistent part quality.

In addition to the Flexible Manufacturing Systems, PIETRO CARNAGHI provided complete turnkeys on the parts consisting of part processing, part programs, tooling, and workholding systems.

The pallet changer system is conceived to transport 2 parts at the same time on the shuttle, so to reduce transport time.

A multiple set of Parking Stations (SPS) is designed to support production needs in terms of idle time for machine feeding.

### Cell Management Software.

The whole software is conceived to have several levels of customization, starting from a basic level of FIFO (First in-First out) up to a fully automatic production scheduler system with input data forms to setup the production needs for every day/week.

Any event can be managed by the system, having stations dedicated to store pallets with tool breakage parts, missing tools in the process, etc.

The PIETRO CARNAGHI Software is also connectable to Customer Plant Management Systems.

DOUBLE SHUTTLE  
SYSTEM FOR PALLETS



LOADING AND UNLOADING STATION

LASER ROBOTS FOR HEAT TREATMENT / DEBURRING

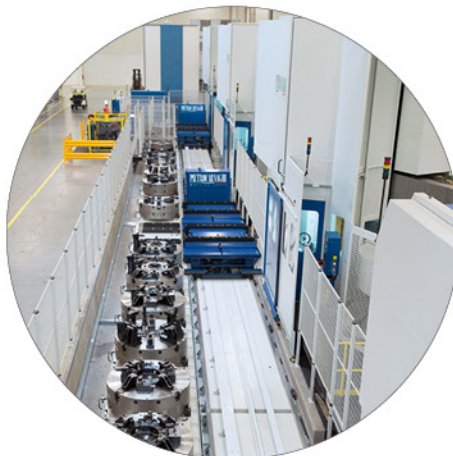


FMS production software studied to optimize the scheduling of part programs, tool management, part probing, calibrations and feeding in the workpieces.

PALLET PARKING STATIONS



Tool Management System: shuttle to handle thousands of tools connecting machine tool magazines



Extremely precise part positioning guaranteed in the FMS, with PIETRO CARNAGHI sub-base coupling for pallet



Full integration of multipurpose machines

# OPTIONS

## Numerous machining table variants



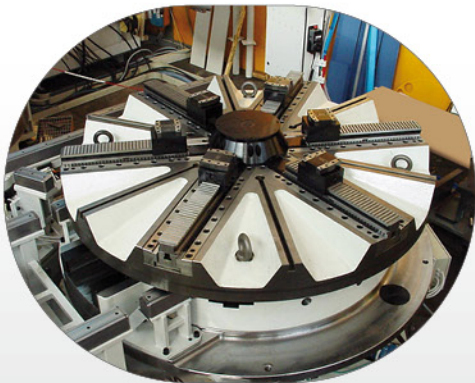
Special chuck jaws



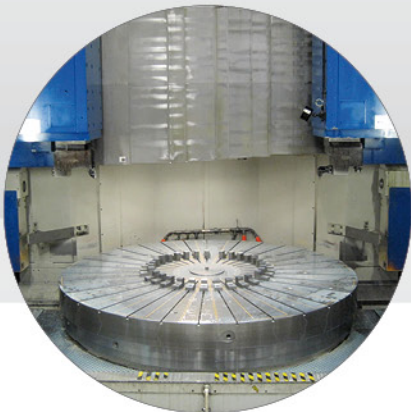
Magnetic chuck jaws



Automatic chuck jaws



Special design for chip evacuation

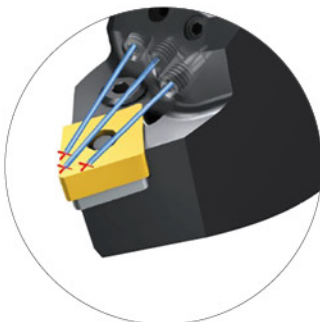
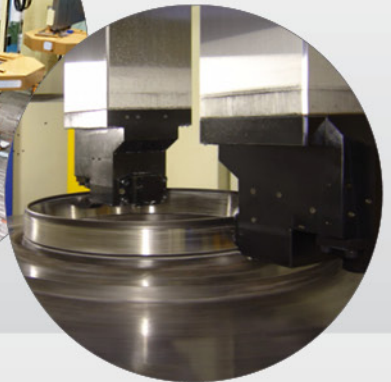


Hard Turning

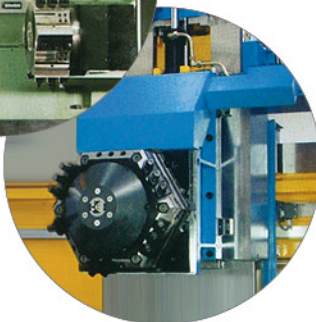
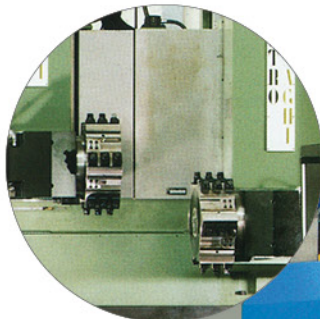


## Twin rams for maximum cutting performance

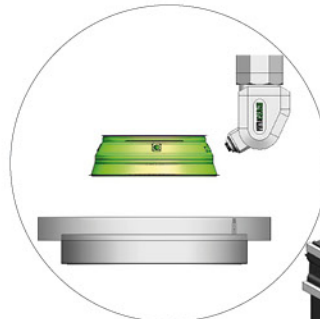
- Mirror configuration to compensate cutting forces on thin wall surfaces
- High chip removal in roughing operations
- Drilling operations on multi drill component



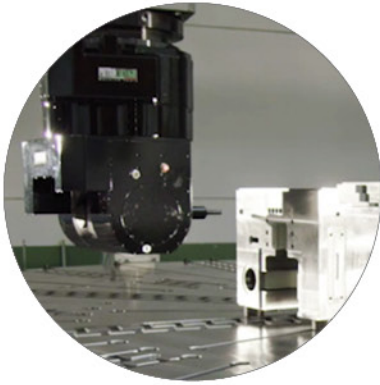
Ultra High-Pressure coolant pack (350 bar) for machining titanium and high resistant superalloys



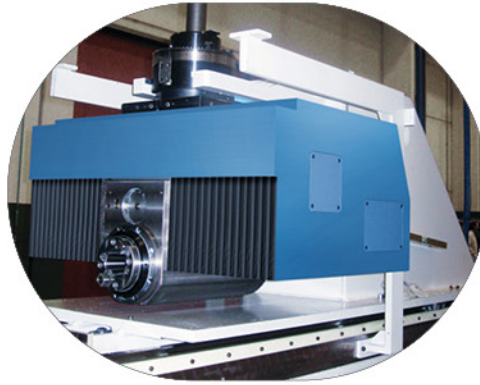
Turret, double turrets



Complete turnkey for machining aerospace materials (configurations, tool list, part program, first component machining, batch runoff)



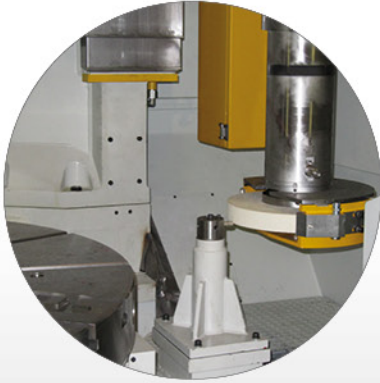
Double transmit heads



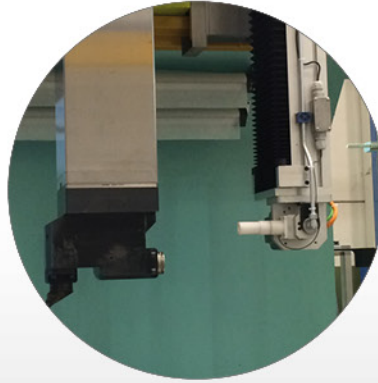
Y axis heads



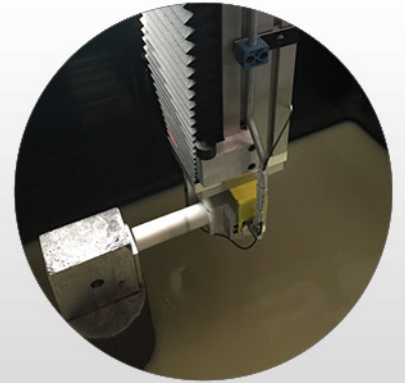
Special T slot cutting package for turbines applications (movable axis toolholders, minimum boring size, rigidity at extreme Z axis stroke, dampening sensor and special software package)



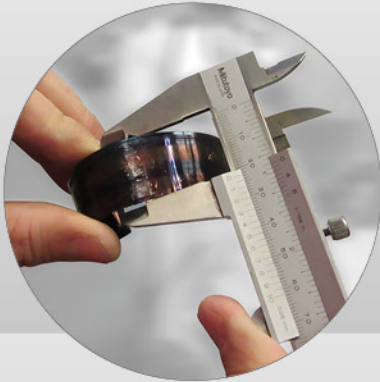
Grinding accessories



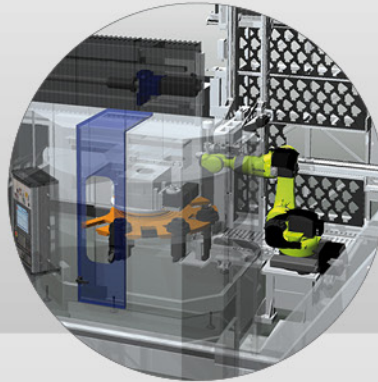
Additional probing RAM



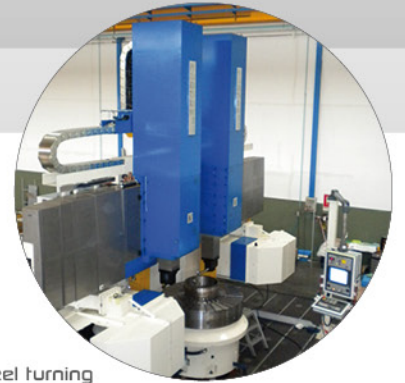
Unmanned high accuracy thickness measuring (ultrasonic probe) of the machined parts in order to avoid human error, reduce the lead time and store/use the measurement results.



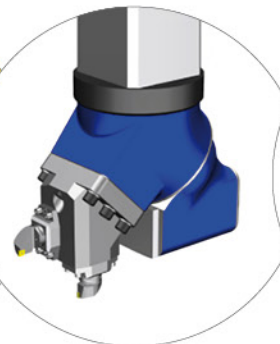
Special high chip removal package for forging applications (reinforced enclosures, special toolholders, chip-breaking system, guard washing system, extra wide chip conveyor channels)



Multiple accessories and tools handling systems (robot, rack, tower, chain, disks, etc)



Railway wheel turning



Several machining heads and accessories



Friction stir welding

## MISSION

*“Keep the customer operative extending the machine life cycle”*

Focused on customers through a partnership approach, we are aimed by the provision of a quick response to requests with high skilled competence governed by the aim of short production break downs.

## VISION

*“A global coordination providing a local service”*

Provide local services to customers coordinating each branch office by a global strategy to have a qualitative common and unique result wherever Pietro Carnaghi is operating.

- Installation Project Management;
- Interventions and repair services;
- Teleservices through remote connection;

- Spare parts;
- Preventive maintenance programs;
- Inspection & audit;

- Retrofit and modification;
- Machine relocation;
- Training and technological support;



- Headquarters
- Branch
- Service - Sales Dept.

**PIETROCARNAGHI**  
Machine Tools

SINCE 1922



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COMPANY WITH  
QUALITY SYSTEM  
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