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PIETROCARNAGHI.IT

PIETRO CARNAGHI GLOBAL SERVICE 24/7

VISION - A GLOBAL COORDINATION PROVIDING A LOCAL SERVICE

- PROMPT 24/7 SERVICE ON SITE
- TELESERVICE THROUGH REMOTE CONNECTION
- SPARE PARTS SUPPLY
- PREVENTIVE MAINTENANCE PROGRAMS
- GEOMETRICAL INSPECTION AND AUDIT
- TRAINING COURSES ON SITE
- TURNKEY PROCESS SUPPORT

MACHINE TOOLS MADE IN ITALY - SINCE 1922

PRODUCT RANGE



THE COMPANY

- Located in Villa Cortese Milan (Italy)
- MORE THAN 10 DECADES OF EXPERIENCE :
- Manufactures Machine Tools since 1922
- Leader in production Machine Tools and Vertical Lathes since 1970
- Production Capacity:
- Up to 35-40 systems per year
- More than 1000 machines installed Worldwide



FINANCIAL STABILITY

PIETRO CARNAGHI SPA obtained the D&B Rating 1, the max level of reliability for financial stability status.



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, since year 2000.



MADE IN EUROPE

100% italian private property Company, with the support of high technological district in Europe. Cooperation with UNIVERSITY Milano – Politecnico and Aachen University - Germany



GLOBAL SERVICE

24 hours service available, 4 local branches worldwide, commitment to customer support.
(Pietro Carnaghi Spa, IT; Pietro Carnaghi Trading Co. LTD, CN; Pietro GMBH, DE; Pietro Carnaghi Inc. , US).



ITALIAN DESIGN

Design of all the machines made in house, by Technical office and Research and Development department.



Made in Europe

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =



Follow us





EXPERIENCE

KEY FEATURES

- HYDROSTATIC AXIS**
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.
- 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.

VERTICAL LATHES

Hydrostatic multitasking vertical lathe 5 Axis milling capability.



- Hydrostatic axis with high static and dynamic axis stability
- High acceleration + axis speed up to 40 m/min
- Direct Drive Spindle for Milling and Turning table
- 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 table integrated
- Different heads for different milling/drilling/turning ops.
- Rigid and precise HIRTH coupling connection between accessory and RAM (5 micron repeatability)



T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		FLEXTURN 25	FLEXTURN 25 W
Turning Platform	mm	1600 / 1800 / 2000	
Turning / Swing	mm	2500	
Milling Square	mm	2100 X 2100	
Max. Weight - no APC (APC)	ton	10 (7)	
Turning Power	kW	60 (120)	
Turning Speed	rpm	400 / 350	
Turning Torque	KNm	21	
Turning Height	mm	1100 (1400)	(1700/2000)
OCTAGON RAM section	mm	400	
Z Axis stroke (RAM)	mm	1100 (1400)	
Y Axis stroke (Carriage)	mm	2100	
X Axis stroke (Table Saddle)	mm	2100 (+2050 /-50)	
Movable Crossrail	mm	---	400 (700 /1000)
Milling Power	kW	30	
Milling Speed	rpm	6000 - 10000 HS	
Milling Torque	Nm	939	



Integrated Movable Table



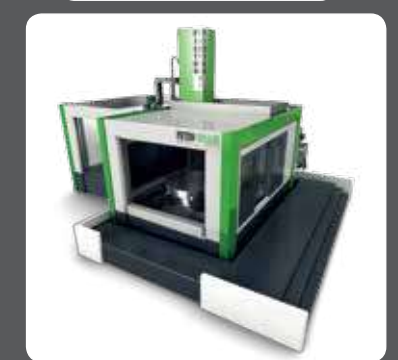
Fully rigid turning feature with z axis extension



Extreme compact design



Octagonal shape ram with milling direct drive, with exchangeable accessories



Compact Design

ATT SERIES

ATT VERTICAL LATHES DOUBLE TABLE

- 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)



ATF SERIES

VERTICAL LATHES - MASSIVE SINGLE FRAME

- 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
- 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
- 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)



Version with RAM carriage



Version with Turret



One Operator for 2 components



Workpiece Handling System



Optimal footprint for intensive production



Compact optimized massive structure for accuracy and rigidity



Pallet systems



HIRTH coupling



Ultra High Pressure coolant 350 bar available



Internal Enclosure washing system



Full enclosure available



Extra platform for Auxiliary Equipment



T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		ATT8	ATT 10	ATT12		ATT14	
Max turning diameter	mm	800	1000	1200		1400	
Motor type		direct drive					
Table Diameter	mm	800	800/1000	1000		1250	
Turning Power	kW	60	60	60	100	60	100
Table RPM	rpm	800	800	800	800	650	650
Torque	KNm	7	7	7	7	7	7
C axis: rpm	rpm	20	20	20	20	20	20
C axis: torque	KNm	7	7	7	7	7	7
Table loading weight	t	12					
Ram section	mm	250 x 250					
Z axis stroke	mm	UP TO 1800					
Milling Power	mm	41					
Torque	mm	1500					
Milling RPM	kW	3000 / op 6000 / 10000 HS					
Rapid axis feedrate	rpm	30.000					

T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		ATF8	ATF 10	ATF12		ATF14	
Max turning diameter	mm	800	1000	1200		1400	
Motor type		direct drive					
Table Diameter	mm	800	800/1000	1000		1250	
Turning Power	kW	60	60	60	100	60	100
Table RPM	rpm	800	800	800	800	650	650
Torque	KNm	7	7	7	7	7	7
C axis: rpm	rpm	20	20	20	20	20	20
C axis: torque	KNm	7	7	7	7	7	7
Table loading weight	t	12					
Ram section	mm	250 x 250					
Z axis stroke	mm	UP TO 1800					
Milling Power	mm	41					
Torque	mm	1500					
Milling RPM	kW	3000 / op 6000 / 10000 HS					
Rapid axis feedrate	rpm	30.000					

AC MONO SERIES

VERTICAL LATHES - SINGLE COLUMN DESIGN

- 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
- Massive 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)



AC 3IMO SERIES

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

VERTICAL LATHES - DOUBLE COLUMNS DESIGN

- Massive 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)



Different table bearings for different applications



Additional measuring ram



Complete Enclosure Available



Movable Platform for operator in machining area available

Available with twin rams for maximum cutting performance



Horizontal side ram available



Internal enclosure in stainless steel available



Operator elevator



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 type		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	275	275	200
Torque	KNm	22,5 30	22,5 30	30 47,5	37 50,5	35 50,5
C axis: rpm	rpm	20	20	20	20	20
C axis: torque	KNm	22,5 30	22,5 30	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	UP TO 1800	up to 1800 / 2000 / 2400			
Milling Power	mm	41	41 / 44			
Torque	mm	1500	1500 / 2400			
Milling RPM	kW	3000 / op 6000 / 10000 HS	3000 / op 6000 / 10000 HS			
Rapid axis feedrate X/Z	mn/min	30000	30000			
Rapid axis feedrate X/Z	mn/min	20000	20000			

T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		AC 36	AC 42	AC 46	AC 52/AC 57	AC 62	AC 65	AC 70
Max turning diameter	mm	3600	4200	4600	5200 / 5700	6200	6500	7000
Motor		double motor / direct drive						
Table Diameter	mm	3450/3450	3500 / 4000	4000 / 4300	4500 / 5500	5000 / 5700	6000	6000 / 6500
Turning Power	kW	2x31 2x58	2x58 2x92	2x58 2x92	2x58 2x92	2x58 2x92	2x58 2x150	2x58 2x92
Table RPM	rpm	150	150	120	120	100	100	60
Torque	KNm	95 120	154 175	155 196	155 196	220 279	284 360	284 360
C axis: rpm	rpm	20	20	20	20	15	15	10
C axis: torque	KNm	50 110	143 161	143 181	143 181	200 259	255 324	255 324
Table loading weight	t	40	50	80	80	120	200 / 250HYD	200/350HY
Ram section	mm	250x250 / 300x300	250x250 / 300x300 / 350x350	300x300 / 350x350 / 400x400				
Ram stroke: Z axis stroke	mm	UP TO 2400	UP TO 2500	UP TO 3200				
Milling Power	Kw	41 / 44	41 / 44	44 / 58				
Torque	Nm	1500/2400	1500 / 2400	2400 / 2700				
Milling RPM	rpm	3000 / op 6000	3000 / op 6000	3000 / op 6000				
Rapid axis feedrate X/Z	mn/min	30.000	15.000	15.000				
Rapid axis feedrate Y	mn/min	20.000	10.000	10.000				

AP SERIES

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

- Massive 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

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.

MOVABLE TABLE MACHINES

- Massive principal components with mechanical and hydraulic compensation system, Rigid gantry design
- Hydrostatic 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



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



T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE		AP 80	AP 90	AP 100	AP 120	AP 130	AP 140	
Max turning diameter	mm	8000	9000	10000	12000	13000	14000	
Motor		Double motor						
Table Diameter	mm	6000 / 6500	8000 / 8500	8000 / 9000	8000	10000	10000	
Turning Power	kW	2x58 2x92 2x150	2x58 2x92 2x150	2x58 2x92 2x150	2x58 2x92 2x150	2x92 2x150	2x92 2x150	
Table RPM	rpm	60	50 - HYD				35 HYD	
Torque	KNm	284 360 570	320 457 643	320 457 643	320 457 643	606 853	606 853	
C axis: rpm	rpm	10						
C axis: torque	KNm	255 324 513	296 423 595	296 423 595	296 423 595	560 789	560 788 560 788	
Table loading weight	t	200 / 500 HYD				250 / 750 HYD		
Ram section	mm	400 x 400 / 500 x 500 / 600 x 600						
Z axis stroke	mm	UP TO 4000						
Milling Power	mm	58 / 81 / 105						
Torque	mm	2700 / 3000 / 4000 / 12.500						
Milling RPM	kW	3000 / 2500 / op 6000						
Rapid axis feedrate X/Z	mm/min	15.000						
Rapid axis feedrate X/Z	mm/min	10.000						



AS SERIES

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



Possible integration with Horizontal machining centers/hobbing/gashing units



Horizontal Side ram available



Full Auto balancing structures

SH SERIES

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



Dressing wheel



Measurement of parts in process, with dedicated additional ram



Independent grinding carriage (to be added to turning carriage)



Multiple Grinding Electro spindle Heads

T = Turning capability / TM = Turning and milling capability

TYPE OF MACHINE	AS 70	AS 80	AS 100	AS 120	AS 130	AS 140	AS 160	AS 180
Max turning diameter	7000	8000/9000	10000	12000	13000	14000	16000	18000
Motor	Double motor							
Table Diameter	6000 / 6500	8000 / 8500	8000 / 9000	8000	10000	10000	10000	10000
Turning Power	2x58	2x92	2x150	2x58	2x92	2x150	2x92	2x150
Table RPM	60			50 - 40 HYD			35 HYD	
Torque	284	360	570	320	457	643	606	853
C axis: rpm	10							
C axis: torque	255	324	513	296	423	595	296	423
Table loading weight	200 / 500 HYD				250 / 750 HYD			
Ram section	350 x 350 / 400x400 / 500x500 / 600x600							
Ram stroke: Z axis	UP TO 4000							
Milling Power	44 / 58 / 81 / 105							
Torque	2400 / 2700 / 3000 / 4000 / 8100 / 12.500							
Milling RPM	3000 / 2500 / op 6000							
Rapid axis feedrate X/Z	15000							
Rapid axis feedrate Y	10000							



PALLET SYSTEMS

Double Tablet 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

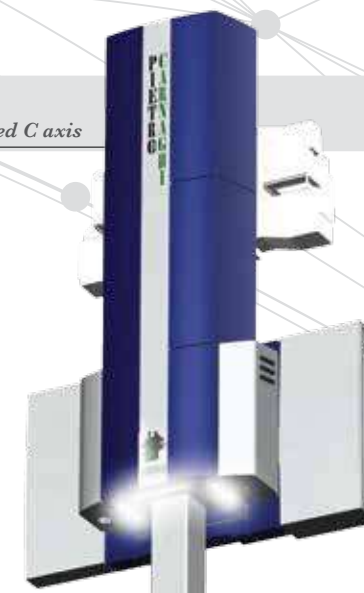


UNIMILL

Direct Drive
milling spindle with integrated C axis

GANTRY MILLING MACHINES - HEAVY STRUCTURE

- Massive 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 turning performances with long-lasting reliability
- Different Machining Area (Pendulum Machining) RAM with enhanced helix angle system



Separate Bridge with fully movable operator platform in machining area



Optional turning table



Fully Automatic accessory change and travelling robot for tools



Automatic telescopic walkable bridge for operator operations

T = Turning capability / TM = Turning and milling capability

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 / 3500	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
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 - 10.000 - 12000										
Ram stroke Z axis	mm	up to 4000 / 6000										
Ram section	mm	500 x 500 - 600 x 600 - 750 x 750										
Milling power	kW	75 - 100 - 125										
Milling torque	Nm	upto 12.500										
Max. RPM	rpm	2500 - 4000										
Rapid feed X, Y and Z	mm/min	25000										
Turning table diameter (option)	mm	3000	4000	5000	6000	8000	10000					

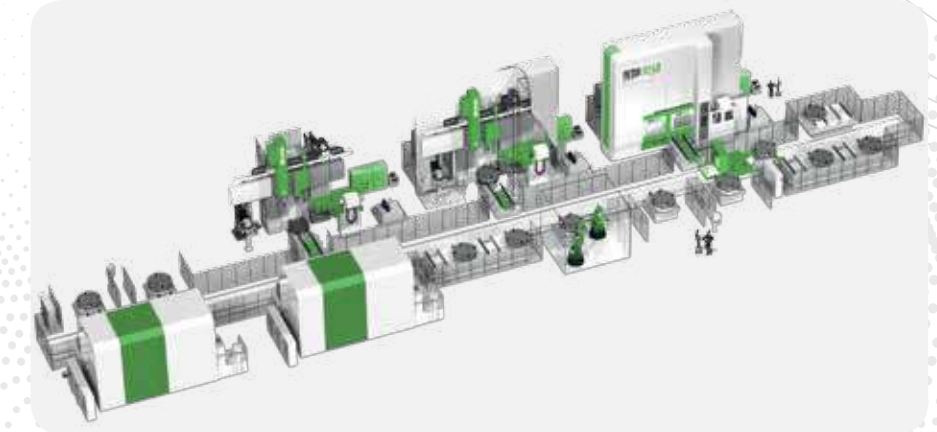
FMS



CUSTOMER: AVIO AERO, ITALY 4 CELLS

CELL MANAGEMENT SOFTWARE **CELL-X** FMS 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 Cell X is also connectable to Customer Plant Management Systems.



CUSTOMER: FIGEAC AERO, FRANCE 2 CELLS



CUSTOMER: CATERPILLAR, USA 5 CELLS



FLEXIBLE MANUFACTURING SYSTEM (FMS)

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.



FMS production software studied to optimize the scheduling of part programs, Tool Management, Part Probing, calibrations and feeding in the workp



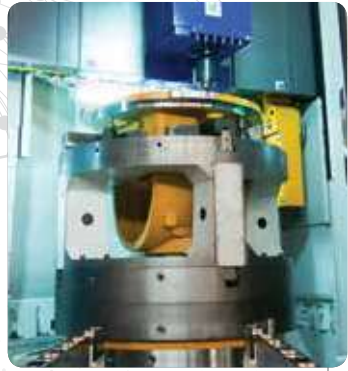
Tool Management System: shuttle to handle thousands of tools connecting machine tool magazines



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

OPTIONS

Numerous machining table variants



Special chuck jaws



Magnetic chuck jaws



Automatic chuck jaws



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)



Special design table for chip evacuation



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 components



Grinding Accessories



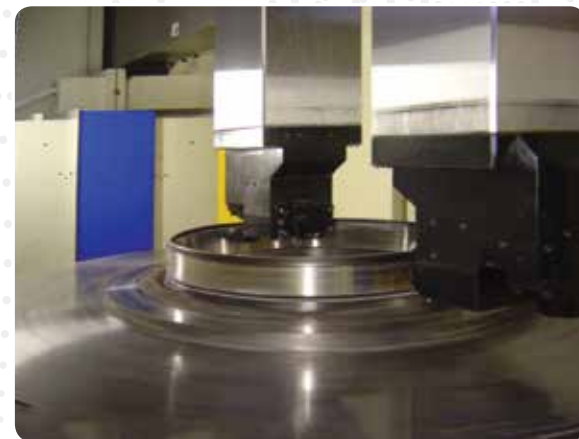
Additional Ram Probe



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.



Hard Turning



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)



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)



Taylor Made Heads



Railway wheel turning



Friction stir welding