CNC MACHINERY SALES AUSTRALIA

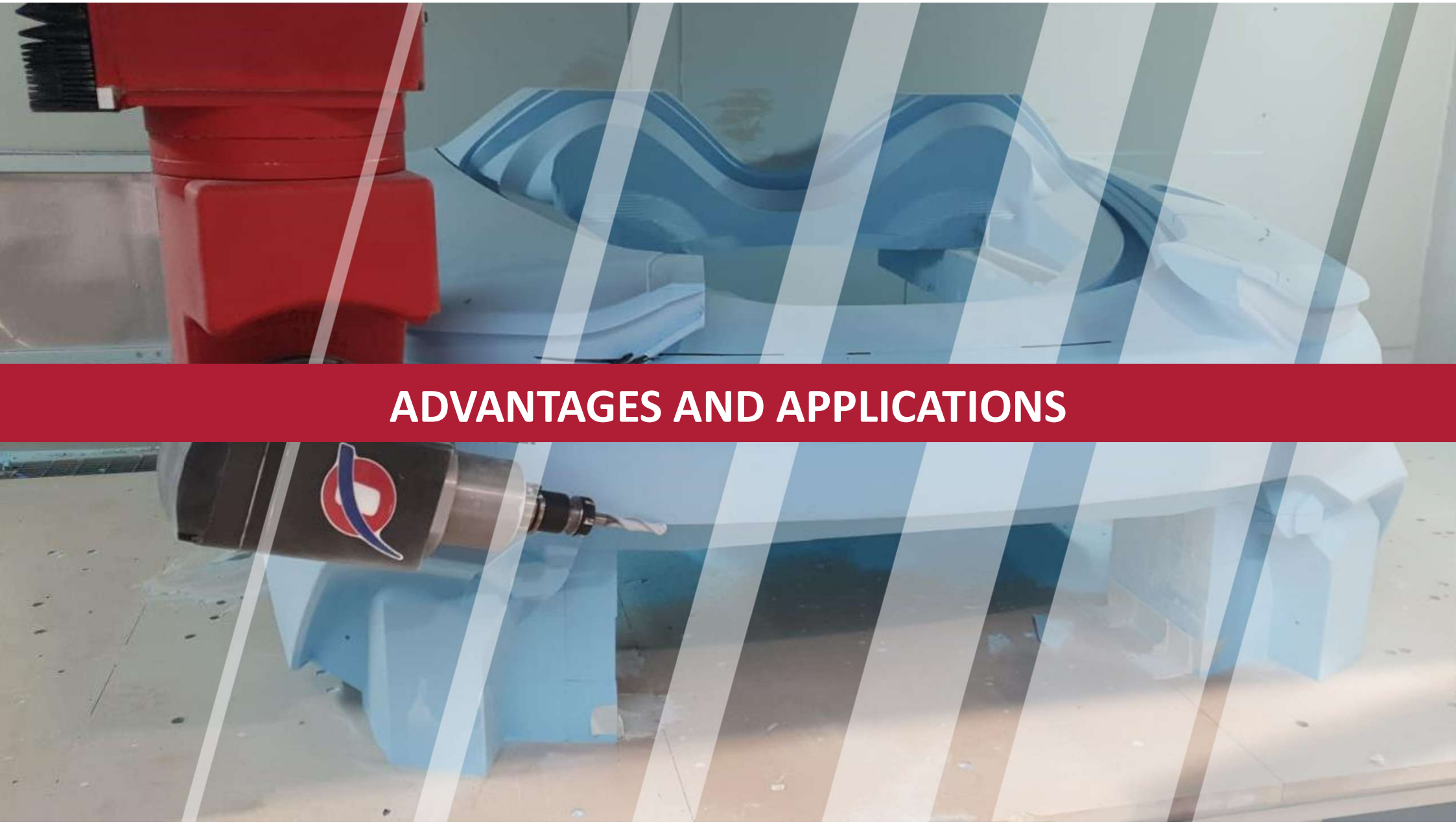
belotti cnc machining centers

FLA

Product Presentation

Agenda

- **Advantages and Applications**
- **Main Features and Options**
- **Success Stories**



ADVANTAGES AND APPLICATIONS

Optimal performances

Higher Accuracy & Backslash Recovery

Monolithic structure to guarantee high **precision and stability** overtime, with thickness dimension up to 10 mm including structure's ribs and thermal **stabilization.**

Glass absolute linear scales* up to 4000 mm stroke, with no need of regulation: **less temperature deviations** compared to the standard linear scales (stroke > 4000 mm).

Vibration monitoring system to preserve machine's and spindle's performances.

Higher Rigidity

Monolithic structure between table and base to increase rigidity and stability.

Reducers with greater reduction to increase dynamic stiffness. *

Intermediate carriage X-Z of increased rigidity thanks to the greater number of skids and the geometric arrangement.

Compact and rigid head with addition of bearing (fifth wheel) which increases the rigidity of the rotating head.*

Higher Speed and Dynamic

Tool change with exchange arm to avoid dust or chips on the tool holders stored.

Faster tool change with exchange arm up to 8''. *

Reduction of cycle times with high-speed machining obtaining the same quality of work with an improvement in dynamics.

Better Working Environment & Chip Management

Configurable and customizable tables based on production needs.

Increased number of places in the tool magazine with chain external to the machine.

Processing with coolant and chip evacuator: liquid filtering through filters and external and internal lubrication of the tool through a low and high pressure liquid supply system. *

Ceiling bellows for the containment of shavings and dust from processing. *

Total enclosure for the containment of dust and noise *

* Optional

Enhanced precision

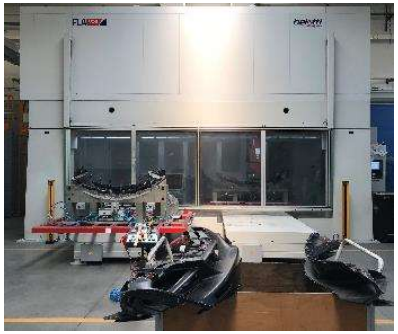
EXAMPLE: FLA 4018

AXIS	TYPE	STROKE	POSITIONING PRECISION	REPEATABILITY
X	Linear	4000 mm	0,035 mm (≤ 0,015/m)	0,015 mm
Y	Linear	1800 mm	0,025 mm (≤ 0,015/m)	0,015 mm
Z	Linear	1300 mm	0,020 mm (≤ 0,015/m)	0,013 mm
C	Rotary	+/- 270°	20 arcsec	10 arcsec
A	Rotary	+/- 120°	20 arcsec	10 arcsec

Advantages and Applications

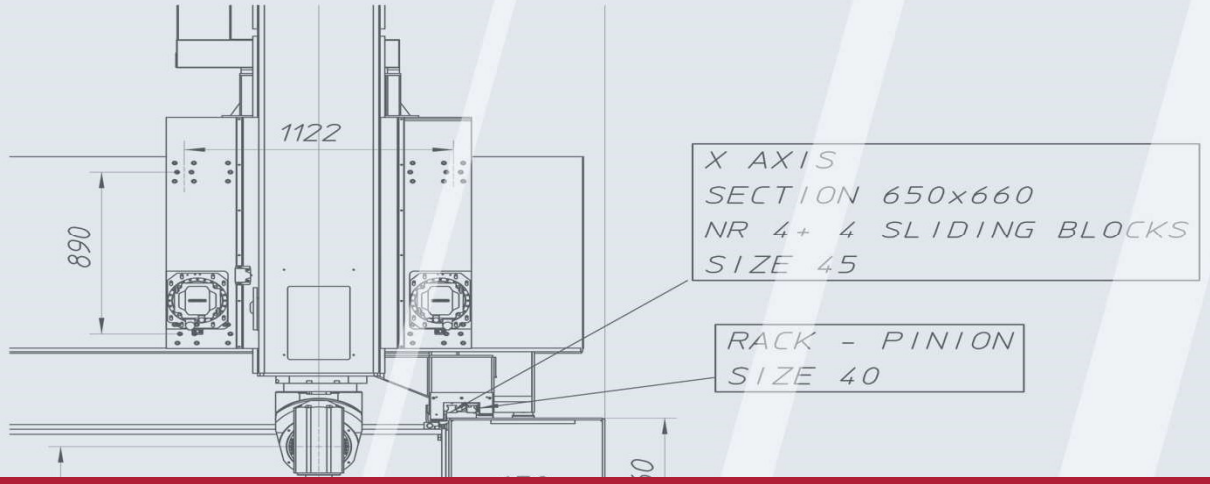
The ideal solution Ideal for model milling and series trimming of composite components at high speed.

Materials: composites and plastic.

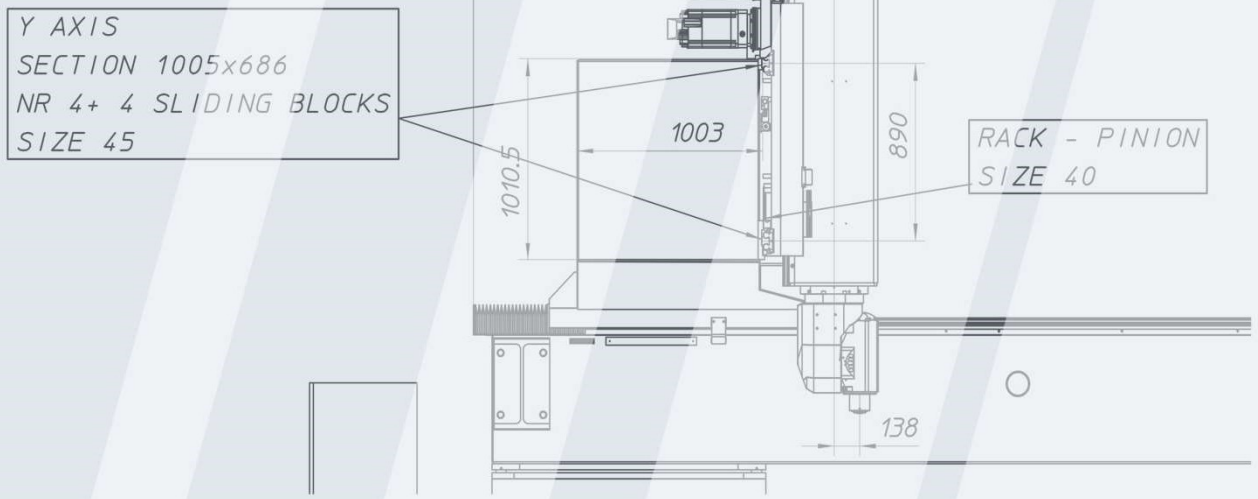








MAIN FEATURES AND OPTIONS



Description

The FLA series represents the right mix of high machining speed (in rapid of X-Y: 80 m / min with maximum acceleration of 0.8 g) and rigidity of the mobile bridge system. The excellent dynamism of the axes also helps to ensure production efficiency in many sectors. These machining centers are ideal for the series trimming of components in composite and plastic materials, but also in wood.

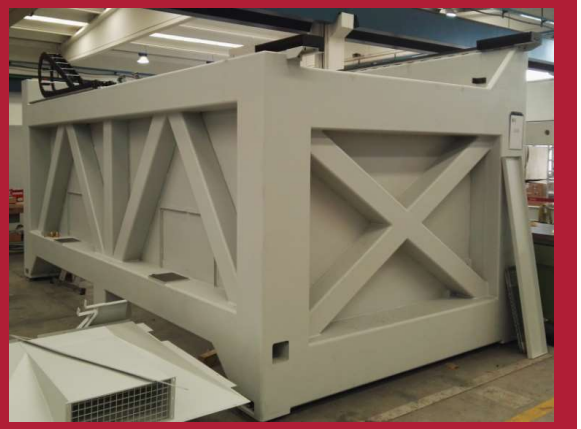
FLA					
Axis	X	Y	Z	C	A
Stroke	3/4/5,5/6,5/9/12 m	1,8/2,6/3,2/5,6 m	0,9/1,3/2 m	+/-270°	+/- 120°
Speed	80 m/min		60 m/min	44 rpm	40 rpm
Spindle	From 6,5 kW up to 22 kW at 24.000 rpm max.				
CNC	Siemens, Heidenhain, Fanuc				
Tool change	From 8 to 30 positions				
Linear accuracy	≤ 0,03 mm/m for linear axes				
Rotary accuracy	+/- 12 arc sec for rotary axes				
Measurement system	Heidenhain glass linear scales, 5 microns resolution				

AUTOMOTIVE | AEROSPACE | RAILWAY | DESIGN | MEDICAL | ENERGY | AUTOMOTIVE | PATTERNS & MOULDS

Structure

MONOLITHIC STRUCTURE 3018, 4018, 5018, 5518

These FLA 5-axis simultaneous high-speed machining centers are made of 8/10 mm thick steel, welded and heat treated. They are characterized by a suspension bridge structure that slides on both ends on a monolithic base frame.



Rear of the FLA monolithic structure

Structure

MONOLITHIC STRUCTURE 3018, 4018, 5018, 5518

The longitudinal movement (X axis) is made by a weight-optimized and structurally rigid portal moving in the X axis direction, for high dynamic performance and precision, the transversal movement (Y axis) is made by the carriage which runs on the bridge, and on which is mounted a vertical ram (Z axis) with high bending strength for large ranges.

All the linear axes movements are managed by electric "brushless" motors on a rack / pinion system and are equipped with highly precise, pre-loaded re-circulating runner blocks.

The Z axis is provided with balancing and stop devices which prevent the machine from damages in case of voltage drop.

Structure

STRUCTURE WITH COLUMNS 3026 – 4026 – 5526 – 5532 – 6526 – 6532 - 12056

These 5-axis simultaneous and high-speed FLA machining centers are made of 8/10 mm thick steel, welded and heat treated. They are characterized by a suspension bridge structure sliding on the two extremities.

The longitudinal movement (X axis) is made by a weight-optimized and structurally rigid portal moving in the X axis direction, for high dynamic performance and precision, the transversal movement (Y axis) is made by the carriage which runs on the bridge, and on which is mounted a vertical ram (Z axis) with high bending strength for large ranges.

The Z axis is provided with balancing and stop devices which prevent the machine from damages in case of voltage drop. The fourth axis (C) rotates the machining unit around the vertical (Z) axis and the fifth one (A) inclines the spindle in the vertical plane.

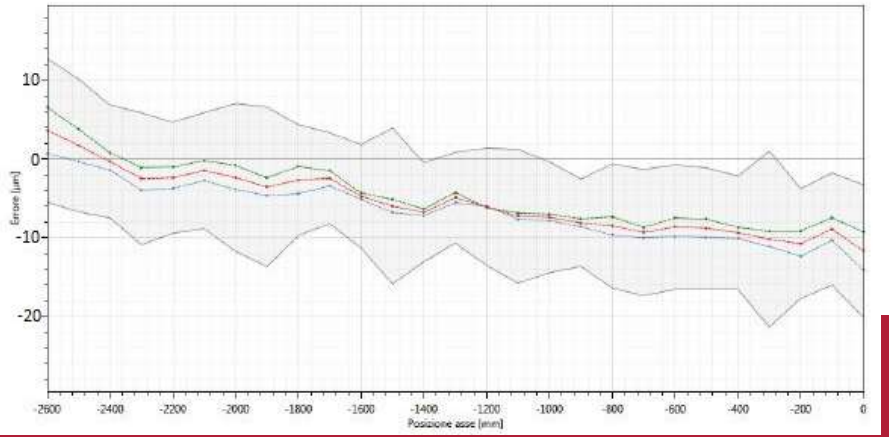
Handling Axes

VDI-DGQ 3441 – WITHOUT ENCODERS

Specified machine accuracy can be achieved at a constant room temperature of 20°C +/-2°C

After the installation of the optical scales and the final assembly of the machine, each axis is calibrated. The calibration table is stored in the CNC memory. The CNC uses this data to automatically compensate the axis positions. The laser interferometer system releases a positioning accuracy certificate based on VDI-DGQ 3441.

VDI 3441 **ASSE X without encoders**



ADVANTAGES

- With a scheduled preventive maintenance, **guaranteed performances** in terms of: **precision and repeatability** of the machine, **complete calibration of the linear and rotative axes are maintained**. An yearly recalibration of the machine is warmly suggested.
- **Possibility*** **to create different tables of compensation**, according to the temperature difference in one year, to activate from the CNC directly.

Accuracy (10 axis strokes test):

Positioning uncertainty	P = 30 µm (stroke 2600)
Repeatability	PS= 15 µm

* Optional

Handling Axes

VDI-DGQ 3441 – WITH ENCODERS

Specified machine accuracy can be achieved at a constant room temperature of 20°C +/-2°C

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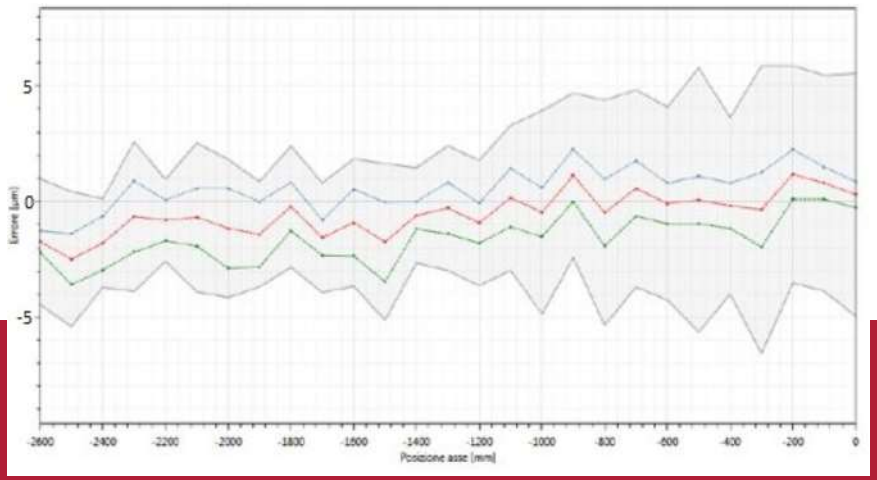


ADVANTAGES

- With a scheduled preventive maintenance, **guaranteed performances** in terms of: **precision and repeatability** of the machine, **complete calibration of the linear and rotative axes are maintained**. An yearly recalibration of the machine is warmly suggested.
- **Possibility*** **to create different tables of compensation**, according to the temperature difference in one year, to activate from the CNC directly.

Accuracy (10 axis strokes test):

Positioning uncertainty	P = 15 µm (corsa 2600)
Repeatability	PS= 10 µm

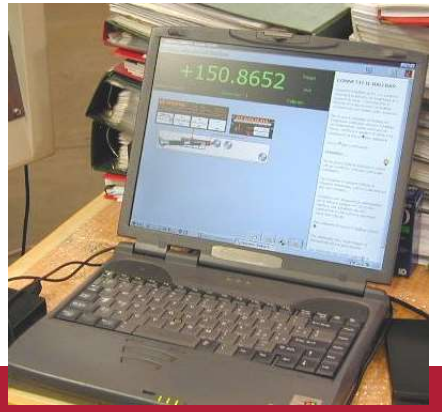
* Optional

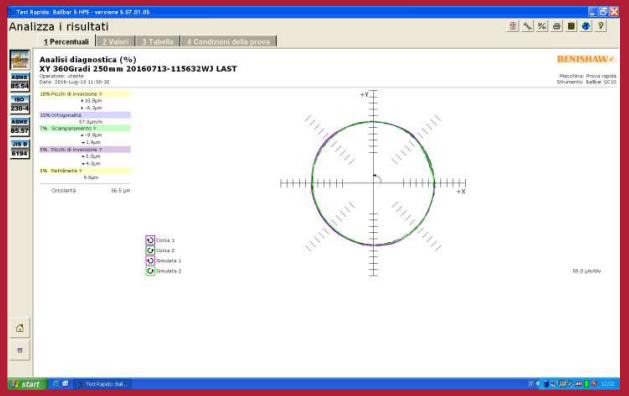
Handling Axes

BALL-BAR

Used to test dynamic behavior of two interpolated axis.

Ball-bar detects the right tuning on the motors, reducing the axes dynamic errors as well as the typical marks on the workpiece's outlines, due to their reversed directions.





ADVANTAGES

- **Enhanced precision**: useful for checking the interpolation errors between two axes, checking the mechanical backlash, dynamic axes errors and squareness.

Loading system

It is possible to choose between different loading systems, to better meet the different processing needs:

Fixed table

- **Twin shuttle**
- **Single shuttle**
- **Rotary table**

ADVANTAGES

- **The choice of the loading system allows to adapt the work center to specific production needs, optimizing the production cycle.**
  - **EFFICIENCY thanks to the hidden tooling, the entire time is reduced.**
  - **SAFETY AND SIMPLICITY: the operator does not need to enter the work area during the loading phase.**

Loading system

FIXED TABLE

The standard working table is independent from the machine structure and includes threaded holes and bushings for fixing and centering.

The vacuum connections for the piece clamping are fixed on the edges of the table.

ADVANTAGES

- **The most rigid and precise solution of all: particularly suitable for mechanically clamping equipment and pieces to the table.**

Loading system

TWIN SHUTTLE

Characteristics of the tables:

- Stroke managed as an axis (speed and accelerations can be modified)
- Translation speed up to 50 m / min
- Three fixed working positions inside the machine: they allow the increase of the workable volume along the Y axis
- Maximum standard table load: 600 kg.
- Maximum load of HAEVY boards: 1500 kg, with a maximum deformation of 0.05 mm.

ADVANTAGES

- **it is possible to maximize the use of the machine as the piece loading takes place without downtime with respect to the processing**
- **Easy access for pieces loading / unloading**

Loading system

SINGLE SHUTTLE

Characteristics of the table:

- Stroke managed as an axis (speed and accelerations can be modified)
- Translation speed up to 50 m/min
- Maximum standard table load : 600 kg
- "Pass-through" system: two distinct work stations could be possible.

ADVANTAGES

- **It allows you to have a machine with a long and narrow shape**
- **Easy access for pieces loading / unloading**

Loading system

ROTARY TABLE

Characteristics of the tables:

- Quick Exchange: 9 sec
- Maximum load: 300 Kg.

ADVANTAGES

- **Complete separation between the machine and the external environm**
- **Maximum exchange rate**
- **Ergonomics for the operator**

Working Table

WORKING TABLE WITH DUST SUCTION GRIDS

Working table integrated into the machine structure and equipped with planar supports with holes for fixing equipment or workpieces, complete with grids to allow the suction of dust generated by milling. On the rear side, the suction outlets are connected to dust suction system by means of back collectors.

It must be installed in conjunction with the suction system (fan + filter).

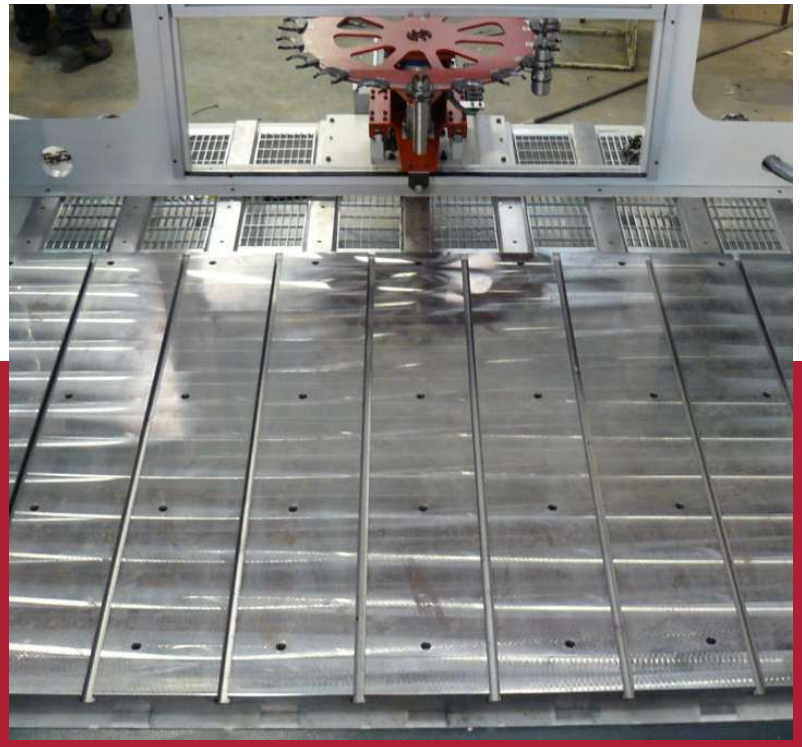
ADVANTAGES

- **Particularly suitable solution for processing dusty materials: complete with a total enclosure and a suitable suction system, it makes the work environment very clean.**

Working Table

STEEL TABLE WITH T-SLOTS

Steel table with T-slots for fixing pieces: H12 of 22 mm, center distance 250 mm, with a concentrated load capacity of 500 kg / m2 and a load of 1800 kg over the whole table.



ADVANTAGES

- **The most rigid and precise solution of all: the table mechanically connected to the monolithic structure of the machine guarantees stability and machining accuracy.**
- **The most rigid and precise solution of all: particularly suitable for mechanically clamping equipment and pieces to the table.**

Working Table

ALUMINIUM VACUUM TABLE

Specifically designed for aluminium plate machining, this aluminium table is provided with a grid matrix with grooves for vacuum-evacuation through rubber seals (6 mm diameter, 50 mm interaxis). It is also equipped with a metal insert M10 hole matrix (150 x 150 mm interaxis), for mechanical clamping/vacuum passage.

ADVANTAGES

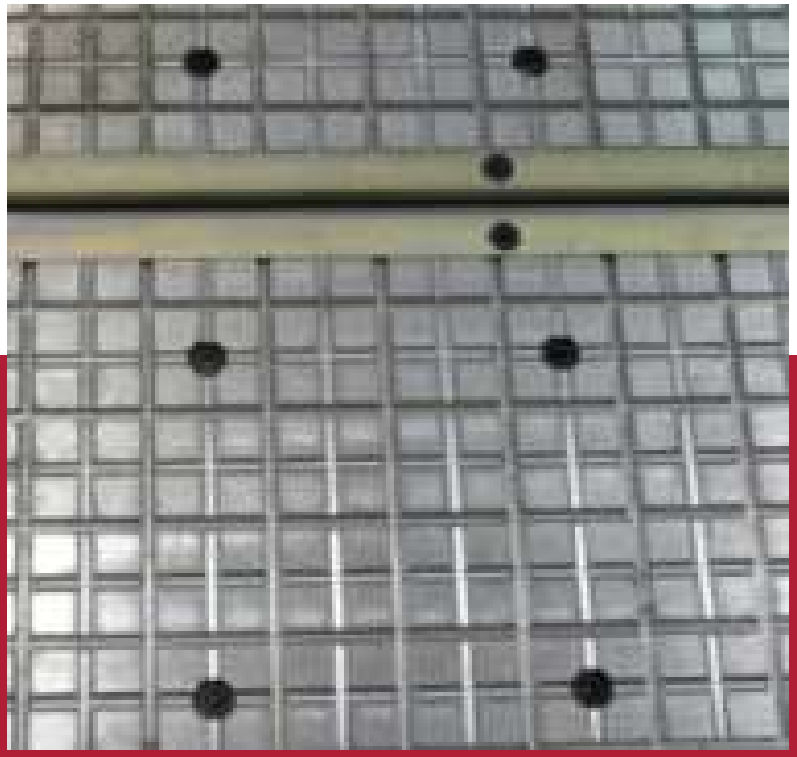
- **Definable clamping area**
- **Possibility to block the piece directly on the table or to combine it with an expendable table.**
- **Removable table: the operator can use the table with T-slots as an alternative**.

Working Table

ALUMINIUM VACUUM TABLES WITH T SLOTS

Aluminium table provided with matrix grids grooves by means of rubber cord (diam. 8 mm, interaxis 60 mm)) for vacuum distribution, specifically designed for aluminium plate machining.

For mechanical clamping/vacuum passage, the table is equipped with a M10 hole matrix, with interaxis 180 x 180 mm.



ADVANTAGES

- The vacuum tables allow a perfect piece clamping, while the T slots enable better mechanical clamping of possible equipments.

Working Table

T-SLOTS TABLE WITH EMBEDDED ZERO POINT

The T-slot table could be customized with embedded zero point connection, pneumatic or hydraulic according to the clamping force required. The zero point distance can be agree with the jig size. The operator can also open or close the zero point using a dedicated M function, that will guarantee the positioning

ADVANTAGES

- **The zero point system is the fastest way to change jigs**: the operator can change the jigs without checking alignement or positioning, with a **repeatability <0,01mm**, using customized reference pins.

Head & Electrospindle

PERFORMANCE HEAD HP

This 5-axis single shoulder head allows tilting and three-dimensional orientation of the tool. Equipped with servomotors with reducers, a pneumatic locking system and encoders mounted directly on the rotary axes, it is able to guarantee movement accuracy.

ADVANTAGES

- **Compact design and high rigidity for strong trimming and milling cycles and to reduce the collisions**.
- **Particularly suitable for working in confined and internal spaces.**

Head & Electrospindle

HIGH PERFORMANCE HEAD HP2

This 5-axis head is equipped with a YRT (axial / radial) rolling bearing to reinforce the attachment of the head on the C axis. This allows to increase rigidity and reduce vibrations during handling. Equipped with servomotors with reduction gears, a pneumatic locking system and encoders mounted directly on the rotary axes to ensure precision of movement.

ADVANTAGES

- **Even greater rigidity and bracking torque**: two time bigger than the HP head.

Head & Electrospindle

PERFORMANCE HEAD HP

- Axis C +/-270°
- Axis A +/-120°
- Rotary accuracy 24 arc/sec
- Repeatability 12 arc/sec
- Pneumatic brakes
- Brakes torque C: **840 Nm**
- Brakes torque A: **420 Nm**

Equipped with:

ELECTROSPINDLE 15 kW

- Power: **15 kW** (S1) and **18 kW** (S6), **12 Nm a**
- Max. torque: **12 Nm** at 12.000 rpm
- Tool taper: shaft **HSK A63** at max. 20.000 rpm; shaft HSK F63 at max. 24.000 rpm
- Liquid cooled spindle
- Permanent grease lubrication
- Front / back bearings: ceramic / steel
- Cutting tool lubrication with rotary joint*

* Optional

HIGH PERFORMANCE HEAD HP2

- Axis C +/-270°
- Axis A +/-120°
- Rotary axis accuracy: 24 arc/sec
- Repeatability: 12 arc/sec
- Pneumatic axes brakes
- C axis clamping force: **1400 Nm**
- A axis clamping force: **840 Nm**

and with:

ELECTROSPINDLE 22 kW

- Power: **22 kW** (S1) and **25 kW** (S6)
- Max. torque : **18 Nm** at 12.000 rpm
- Tool taper: shaft **HSK A63** at max. 24.000 rpm*; shaft HSK F63 at max. 24.000 rpm
- Liquid cooled spindle
- Permanent grease lubrication
- Front / back bearings: ceramic / steel
- Cutting tool lubrication with rotary joint*

* Optional

Double bridge

INDIPENDENT DOUBLE BRIDGE

This double bridge* is the perfect solution **to increase the productivity and the versatility of a single machining center**.

Equipped with the same cutting head of the main bridge.

Minimum distance between the two head: 950 mm along X axis.

ADVANTAGES

- **Enhanced flexibility and higher productivity:**
  - **Double and independent CNC controls for the two bridges**
  - **Optimization of the cycle time up to 50%**

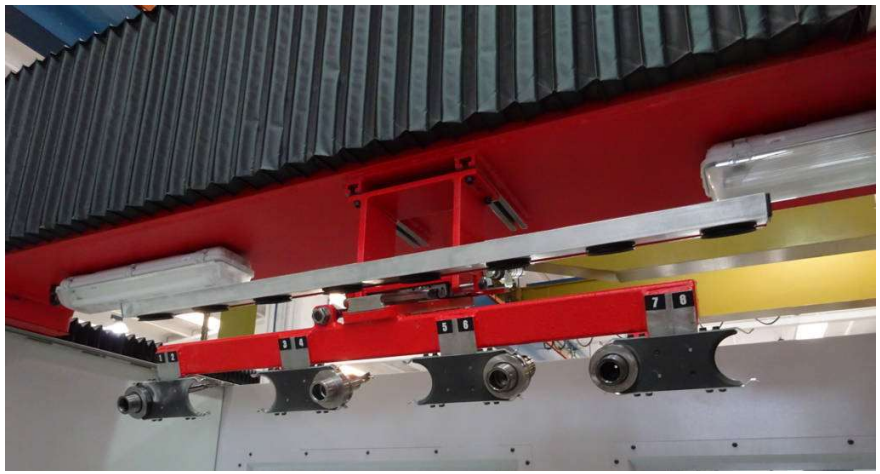
* Optional

Tool change

AUTOMATIC TOOL CHANGE

The standard 8 position fully Automatic Tool Changer is mounted on the travelling gantry of the machine, enabling tool changes to be made at any position along the machine. The toolholder cones are protected against dust by a retracting panel which is pressurized and sealed.

Tool max weight: 5 kg
Tool max length: 200 mm
Tool max diameter: 110 mm in adjacent positions



Tool change

AUTOMATIC CAROUSEL TOOL CHANGE - 24/30 POSITIONS

The 24/30-position carousel tool changer is integrated on the right/left side of the machine structure and it consists of a carousel featuring HSK A63 and HSK F63 toolholder collets*. The carousel is driven by a gearbox and brushless motor with a maximum rotation of 180°/s to guarantee a faster movement for tool changing, a pneumatic cylinder move the carousel inside the working area during tool changes operations.

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- **24 positions**: **max. tool diameter Ø 130 mm** in the adjacent position, maximum length 300 mm and weight 7 kg.
- **30 positions**: **max. tool diameter Ø 110 mm** in the adjacent position, maximum length 300 mm and weight 5 kg.

ADVANTAGES

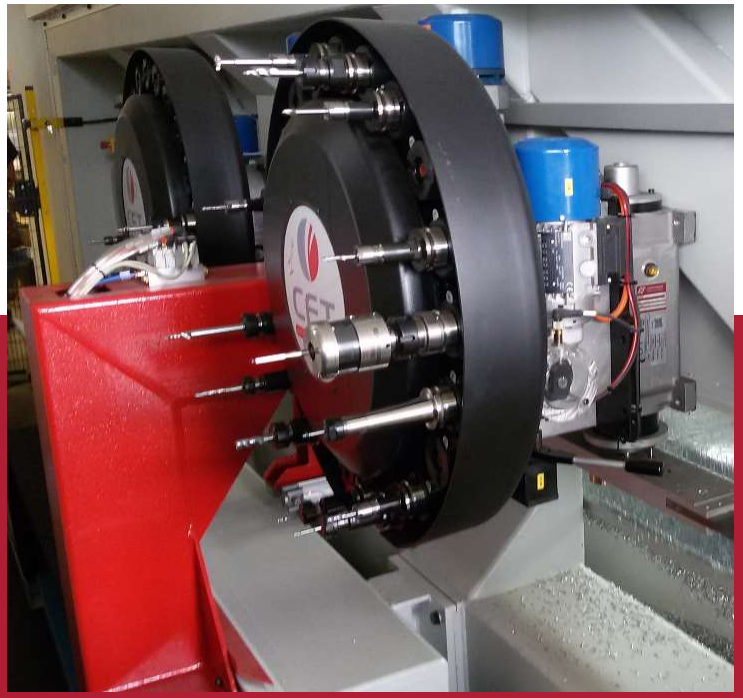
- **INCREASED SAFETY AND EFFICIENCY:**
  - **Massively reduced dust problems on the tool holder**, thanks to the tool changer's location outside the working area.
  - **Increased protection of the tools** from dust or chips due to the **pneumatic door**.
  - With the operating machine, **tools can be replaced manually through a safety side access**.
  - **Reduced errors from the operator** thanks to a safety signal controlling the tool change.

* Optional

Tool change

CHAIN TOOL CHANGE - 40 POSITIONS, WITH EXCHANGE ARM

Max. sizing with adjacent tools: 100 mm
Tool split: 107,668 [mm]
Max. length : 300 mm
Max. tool weight : 12 kg
Max. system's weight: 300 kg
Max. speed of the chain: 27 m/min
Arm exchange speed: 2''
Tool change total time: 18''
Photocell checking the tool's position
Tool change not at fixed position (random)



ADVANTAGES

- **INCREASED SAFETY AND EFFICIENCY:**
  - The tool changer's location outside the working area leads to an **increased protection of the tools from dust or chips**.
  - A photocell assess each tool's position and its holder's presence, **avoiding collisions due to the operator's errors.**

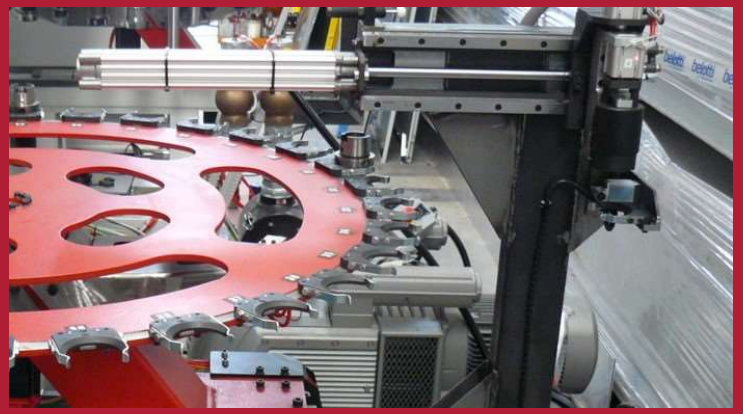
Chip Reader

CHIP READER*

Automatic reader system for tool holders. The system is assembled on the tool changer carousel and when the operator will load a new tool, the reader will automatically update all the tool information (length, diameter, life …) coming from the chip already installed in the tool holder (the writing system is not included in the supply).

ADVANTAGES

- **All information and parameters written automatically outside the machine**, during the tool holder loading operations.
- **All information and parameters not modifiable**, avoiding the operator's errors.
- **Reduced mistakes from the operator** compared to standard conditions: tool loading in a wrong position, manually writing a wrong value of the tool's length, deleting tool parameters from the table and generating a machine collision.



* Optional

Protection System

TOTAL ENCLOSURE

The total enclosure is designed to guarantee compliance to the current European noise rules for machining centres**.**

It is made up with a steel frame with sound absorbing panels. The doors to the loading/unloading area are automatic and telescopic and although the door opening is wide the enclosure dimensions are not increased. The doors move on aluminium track and nylon pads which make the opening and closing quite noiseless..

The doors are provided with big windows which enable to look inside the machine and they slide inside the fixed front wall of the enclosure.

Doors are equipped with safety and locking devices that permit the access to the working area only if machine is stopped.

ADVANTAGES

- Ideal for environments where the noise level must be less than 80 dba and the processing dust must be sucked up completely without polluting the external environment.
- Functionality: the pieces and any equipment can be loaded from the front of the machine.

Protection System

MANUAL UPPER ROLLING SHUTTER

The bellow limits the escape of chips from the workstation area.

The special translucent fabric guarantees ample light in the work area, already artificially illuminated. The shutter can be easily released allowing the overhead travelling crane loading.

ADVANTAGES

- **Clean & Safety**: the bellow limits the escape of chips from the workstation area.
- **Flexibility and efficiency: the motorized opening of the bellows allows the loading from above with an overhead crane, reducing the time**.

High/Low Pressure Coolant System

COMPLETE LIQUID COOLANT SYSTEM WITH DREDGING CONVEYOR AND FILTERED LIQUID TANK, MECHANICAL PURIFIER AND HIGH/LOW PRESSURE PUMPS

Dredging conveyor

- Watertight body with liquid containment tank having 180 l lubro-coolant capacity
- Dredging blade chips conveyor with 400mm centre distance and 3,5 m/min feed
- 8-bar booster/transfer pump with 50 l/min capacity
- Level adjustment feet
- Wheels for removing the seat in case of maintenance
- Mechanical torque limiting joint lower gear in case of conveyor blocking

Liquid coolant collection tank

- Watertight tank with 800 L capacity (optional 1500 L)
- Minimum / maximum electrical level of the liquid in the tank
- Fabric filter 220 L / min at 35µm with electrical level check if the filter fabric is clogged
- Low pressure pump 50 L / min 8 bar
- High pressure pump 30 L / min 40 bar *
- Double filter 10 µm with visual clogging indicator and by-pass *
- Gun for washing inside the machine

Coolant cooling chiller *

* Optional

High/Low Pressure Coolant System

COOLING SYSTEM COMPLETE WITH CHIP CONVEYOR AND LIQUID COLLECTION TANK, EQUIPPED WITH MECHANICAL PURIFIER WITH FABRIC FILTER, LOW / HIGH PRESSURE PUMPS AND COOLING CHILLER

ADVANTAGES

- **Increased cutting tool life up to 3 times** comparing to the MQL system.
- **Completely clean milling zone** - no chips and small scraps – thanks to the coolant low pressure and flow during milling operations as pocketing or drilling.
- **Guaranteed lubrication of the tool** tip thanks to the high pressure with dedicated cutting tools for internal coolant.
- **Prevention of the overheating**: no melting of the material on the cutting edges.
- **Reduced damages of the tool and worked parts**: **control of the coolant temperature avoiding thermal distortion of the part** during milling process, thanks to an optional chiller.

Dust Suction System

SUCTION HOOD SYSTEM for dry/wet dust removal located on the milling area.

Also available in ATEX version.

PNEUMATIC SUCTION HOOD

The hood has a 100-mm stroke managed through M functions.

It automatically retracts during the tool change process.

ADVANTAGES

- Allowing to locate the high pressure extraction flow close to the spindle - hood position managed by M codes.
- Flexibility: the operator can manage by M codes with different positioning depending on the tool length.

Dust Suction System

SUCTION SYSTEM for 5-axis head with electronic control for dust and chips removal in the working area.
Also available in ATEX version.

MOTORIZED SUCTION HOOD

In a range of 100 mm the electronic hood allows to automatically adapt its extension depending on the real work piece distance.

ADVANTAGES

- Allowing to locate the high pressure extraction flow at the spindle nose - electronical regulation of the hood position.
- Possibility to control the hood as an axis, from the part program.
- Suggested with composite material trimming with lot of dust

Options

SDS MEASURING CYCLE

System for rotary axis and tool length alignment.

It is installed on a telescopic rail with protection against chips and dusts.

È possibile integrare il sistema con una funzione M per la misura della lunghezza e rottura utensile.

The cycle is managed by means of M functions.

ADVANTAGES

- **One tool for axis requalification, length control and tool breakage.**.
- Positioned outside the work area with protection from dust and for the operator, who can manually manage it via M code.

Options

NON CONTACT TOOL SETTING SYSTEM

This flexible laser system model Renishaw NC4, with ultra-compact laser tool setting transmitter and receiver units, is useful for monitoring the tool status and for tool life management.

The system allows fast, non-contact, tool setting and tool breakage detection measured in the real clamping system at nominal speed.

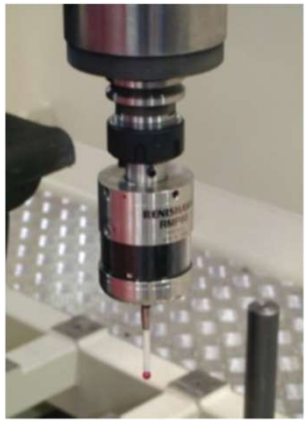
- Pre-setting length and diameter
- Broken detection and wear detection without contact at rapid movement.

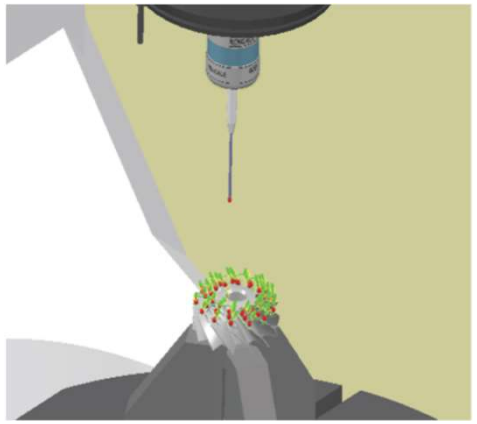
ADVANTAGES

- **Ideal when higher precision of length and diameter measurements is required.**
- Possibility to connect the system with **automatic tool detection for controlling its status**, includin sisters tools management.

Options

3D probing system





Kinematics/Inspections Measure Cycles *

Incremental direct linear measurement system

- up to 4 meters with glass optical band
- from 4m to 72m with steel optical band

* Only for 5-axis

Options

HEIDENHAIN LINEAR MEASURING SYSTEM

Three linear axes direct measuring systems, up to 72m
With graduated metal and pressurized linear scales.

Direct linear measuring system for all rotary axis

Original factory certificate

LC 181 * S.Nr. 11132830D * Id.Nr. 341240-07

Hersteller-Prüfzertifikat

Dieses Längenmessgerät wurde unter den strengen HEIDENHAIN-Qualitätsnormen hergestellt und geprüft. Die Positionsabweichung liegt bei einer Bezugstemperatur von 20 °C innerhalb der Genauigkeitsklasse ± 5,0 µm.

Kalibriernormale:

- Laser-Interferometer Kalibrierzeichen 3649 PTB 95
- Wassertripelpunktzelle Kalibrierzeichen 108 PTB 95
- Barometer Kalibrierzeichen 3028 DKD-K-2301 99-06

Relative Luftfeuchtigkeit: max. 50 %

HEIDENHAIN
DR. JOHANNES HEIDENHAIN GmbH

Manufacturer's Inspection Certificate

This linear encoder has been manufactured and inspected in accordance with the stringent quality standards of HEIDENHAIN. The position error at a reference temperature of 20 °C lies within the accuracy grade ± 5.0 µm.

Calibration standards:

- *Laser interferometer Cal. ref. 3649 PTB 95*
- *Water triple-point cell Cal. ref. 108 PTB 95*
- *Pressure gauge Cal. ref. 3028 DKD-K-2301 99-06*

Relative humidity: max. 50 %

Prüfer/Inspected by:
PFEIFFER / 23.11.2001

Messprotokoll

Die Messkurve zeigt Mittelwerte der Positionsabweichungen aus Vor- und Rückwärtsmessung.

Calibration chart

The error curve shows mean values of the position errors from measurements in forward and backward direction.

Options

VIBRATION MONITORING SYSTEM

Miniaturized monitoring system particularly recommended in aerospace sector and aluminium milling applications, to preserve spindle and CNC machine performance. Using monitoring techniques in modular form and 8 different scenarios, the device can perform control checks and manage production process in real time.

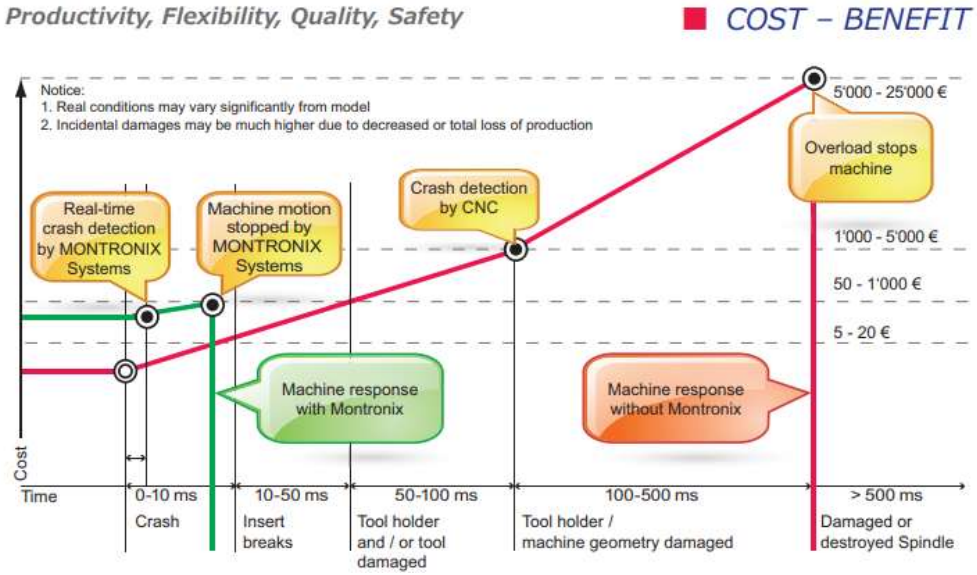
ADVANTAGES

- **Higher performance control** by planned maintenance to: avoid drastic damage, minimize collision effect and **decrease time machine down time and repair costs** (machine response less than 10 m/s instead of 500 m/s).
- **Increased production capability**.

Options

MONTRONIX SOLUTIONS

- Reducing costs by avoiding machine shut downs
- Optimizing processing and station times
- Effectively generating and reading analytical data
- Protecting machines
- Protecting tools
- Protecting work pieces
- Assuring work piece quality
- Securing the process chain for single and multi-part production
- Optimizing processes
- Assisting with preventive maintenance
- Extending the service life of tools and machine



Options

MQL – MINIMAL QUANTITY LEVEL

This system – with aerosol generator for internal and external lubrication – refills itself automatically out of a separate tank and can be determined via parameter settings from the CNC-control regarding the requirements of the cutting operation.
For internal cooling the rotary joint option is required.

ROTARY JOINT

The spindle can be equipped with a **rotary joint to allow the passage of cooling liquid/ air + oil through the tool**. This option allows **to achieve a better milling/drilling quality** since the lubrication is carried out directly the cutting edge and as a result it avoids tool overheating and material melting thus providing a **high finishing quality**.

ADVANTAGES

- Suggested for milling operations with cutting hood and high pressure extraction unit on aluminium.
- **Increased cutting feedrate** compared to the standard external oil mist: the tool tip is **always well lubricated during the milling process**.

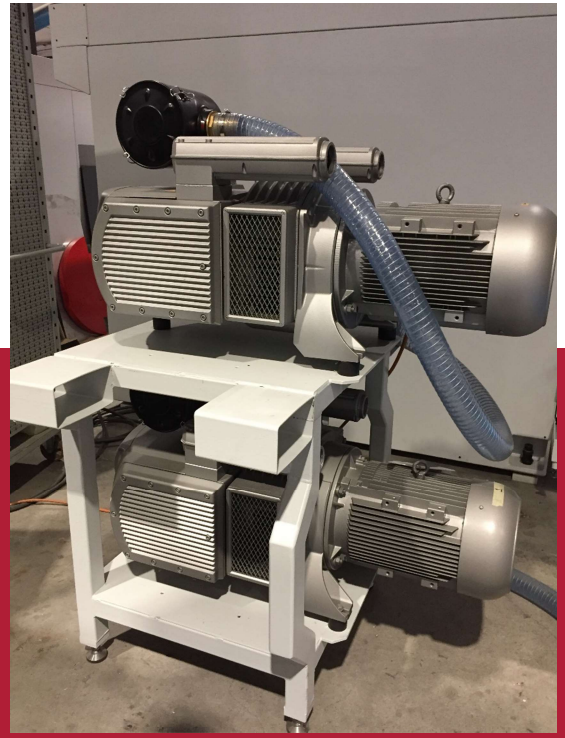
< BACK

Options

CLAMPING SYSTEM WITH VACUUM

In order to guarantee high precision for the fast milling cycle, the machine is equipped with a suction pump 100-1050 m3/h for nesting applications.

As an option, sound proofing enclosures can be supplied along with a cooling fan unit.



ADVANTAGES

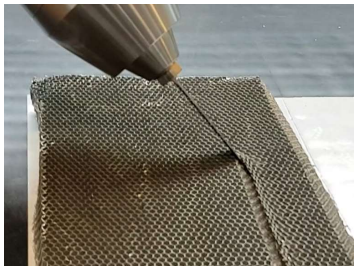
Simplicity and maximum efficiency: the clamping of the pieces by vacuum guarantees a rigid grip without resorting to any cluttered brackets and reduces the risk of collisions and damage to the piece and the machining center.

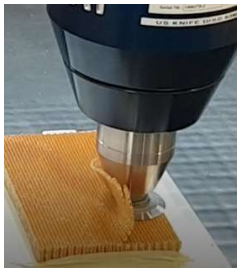
Options

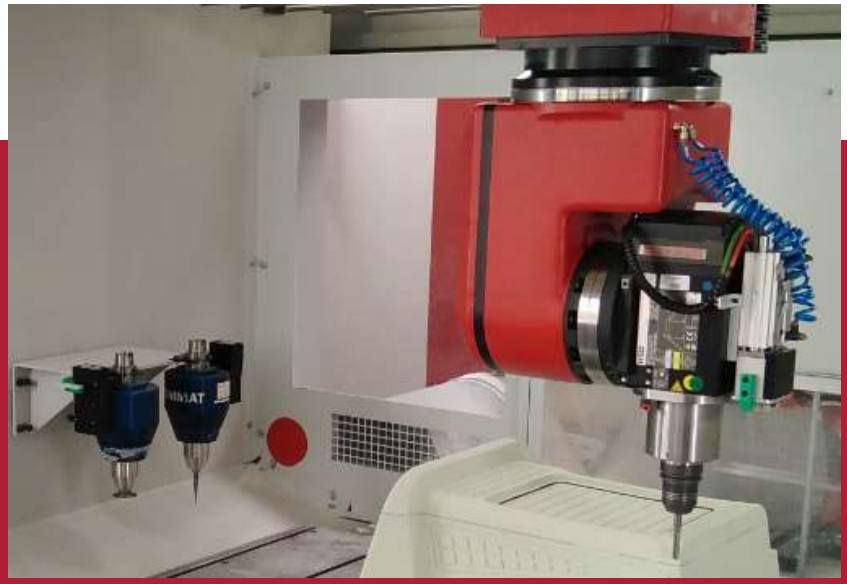
ULTRASONIC TECHNOLOGY

An aggregate that separates the materials with an ultrasonic frequency up to 20 Kilohertz, hooked by the electrospindle like a normal cutting tool. It is equipped with two cutting systems:

- **oscillating blade that is oriented according to the geometry and of different lengths, controlled by CNC and interpolated with the movement of all linear and rotary axes**;
- **oscillating and rotating disc both clockwise and anticlockwise, controlled by CNC**.







ADVANTAGES

- **Particularly suitable for processing soft materials: fabrics, phenolic honeycomb, aluminum honeycomb, rock wool, carpet etc**.
- **Accuracy and cleanliness: thanks to the high frequency of oscillation of the blade, the separation of the material does not produce dust and, in the case of honeycomb, does not produce crushing of the cells.**

SUCCESS STORIES

Composites - Automotive

Application: Plastic, ABS, Carbon Fiber, Fiber Glass, Resins, Wood, Small Aluminum and Light alloys. High productivity in automotive sector with production of high detail, precision and / or size automotive components for the racing sector

CUTTING PARAMETERS		
Material	Composites	
Cutting tool	mm	D10
Thickness cut	mm	8
Width	mm	10
Cutting Speed	Vt	150
Spindle RPM (S)	1/min	4800
Feed rate (F)	mm/min	1600

Composites - Automotive

Application: milling of carbon components for production MCLAREN-LAMBORGHINI-FERRARI-DUCATI

CUTTING PARAMETERS		
Material	Composites	
Cutting tool	mm	D10
Thickness cut	mm	10
Width	mm	10
Cutting Speed	Vt	150
Spindle RPM (S)	1/min	20000
Feed rate (F)	mm/min	3800

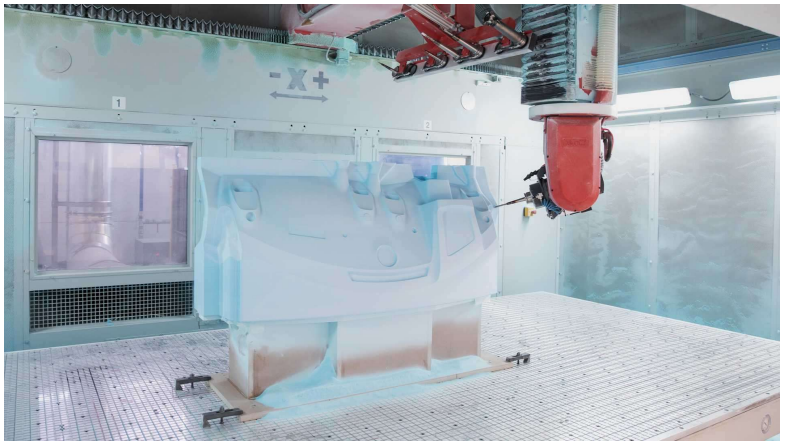
Composites - Automotive

Application: milling of extruded aluminium sections for the production of frames of the major automotive manufacturers

CUTTING PARAMETERS		
Material	Aluminium	
Cutting tool	mm	D10
Thickness cut	mm	3
Width	mm	10
Cutting Speed	Vt	450
Spindle RPM (S)	1/min	14500
Feed rate (F)	mm/min	2500

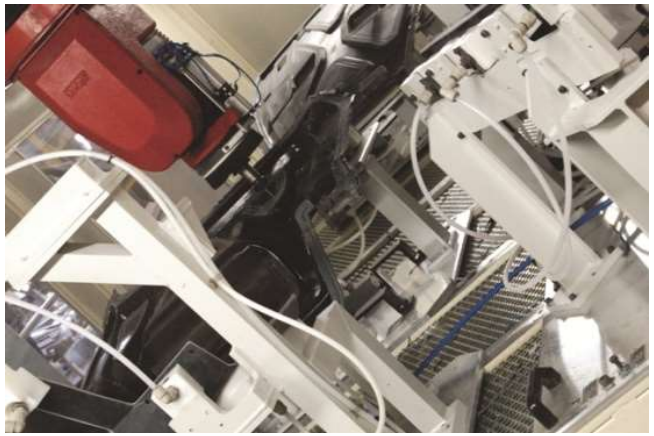
Composites - Automotive

Application: production of models with resins , hybrid and electric supercars manufacturer



Composites - Automotive

Application: milling of carbon fiber parts for cars: PORSCHE , FERRARI e ASTON-MARTIN



CUTTING PARAMETERS		
Material	Composites	
Cutting tool	mm	D10
Thickness cut	mm	8
Width	mm	10
Cutting Speed	Vt	150
Spindle RPM (S)	1/min	5000
Feed rate (F)	mm/min	1500

Composites - Automotive

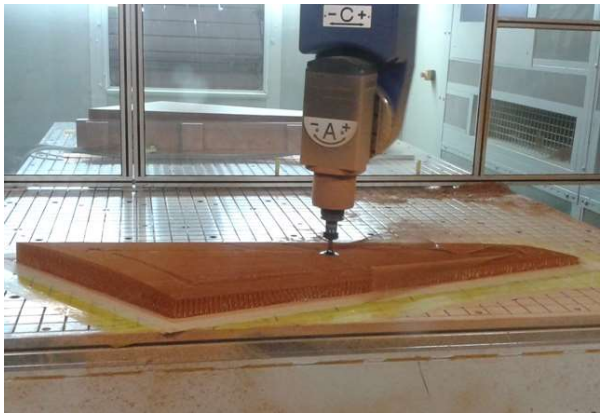
Application: milling of components for car interiors such as dashboards and moldings in sandwich materials

CUTTING PARAMETERS		
Material	Composites	
Cutting tool	mm	D8
Thickness cut	mm	6
Width	mm	8
Cutting Speed	Vt	450
Spindle RPM (S)	1/min	17000
Feed rate (F)	mm/min	3500

Composites - Aerospace

Application: milling of composite material and honeycomb

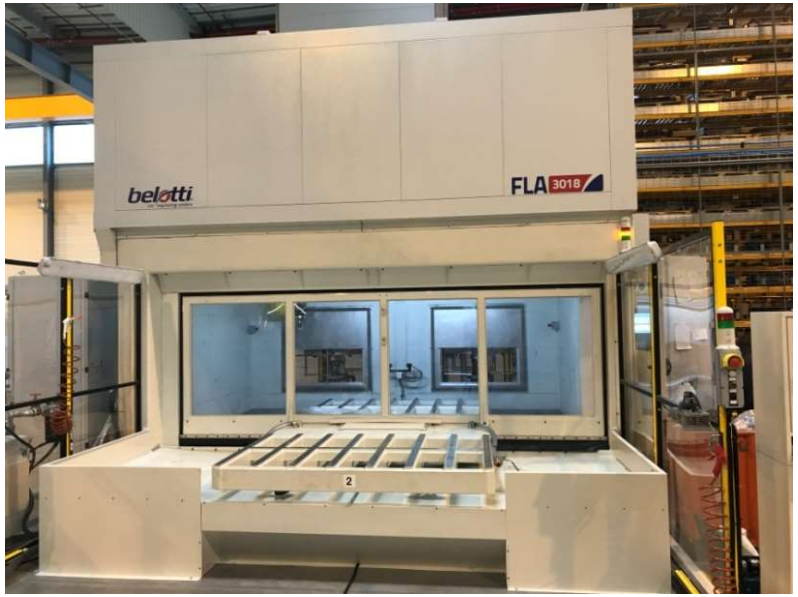
CUTTING PARAMETERS		
Material	Composites	
Cutting tool	mm	D40
Thickness cut	mm	6
Width	mm	40
Cutting Speed	Vt	250
Spindle RPM (S)	1/min	12000
Feed rate (F)	mm/min	2500



Compositi - Aerospace

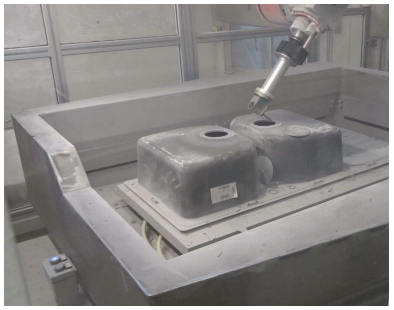
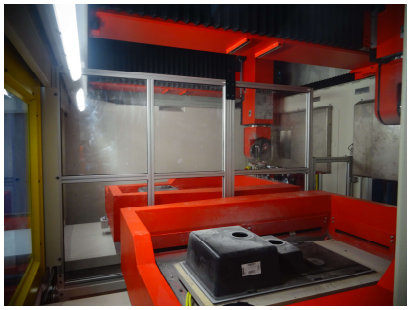
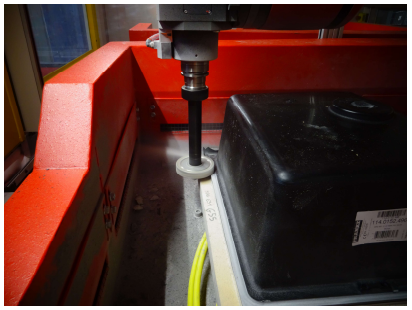
Application: machining of carbon fiber/PEEK parts with coolant system for longer tool life, better finish quality and milling speed, absence of dust on the final parts

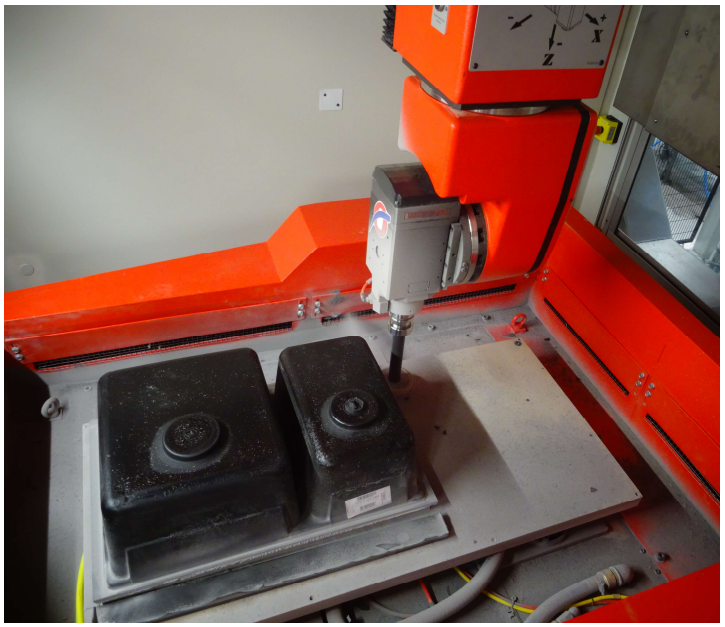
CUTTING PARAMETERS		
Material	Composites	
Cutting tool	mm	D3
Thickness cut	mm	6
Width	mm	30
Cutting Speed (cooled water)	Vt	1750
Spindle RPM (S)	1/min	24000



Composites - Design

Application: milling and trimming of composite sinks




Composites - Design

Application: milling and trimming of composite sinks

Composites - Design

Application: prototypes for sculptures and installations in composites and wood

Composites – Medical

Application: milling of composite materials for medical equipment

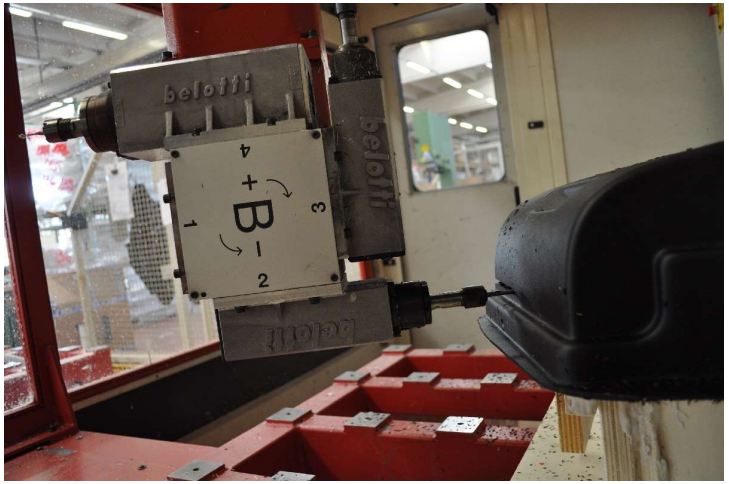
Plastic - Termoforming

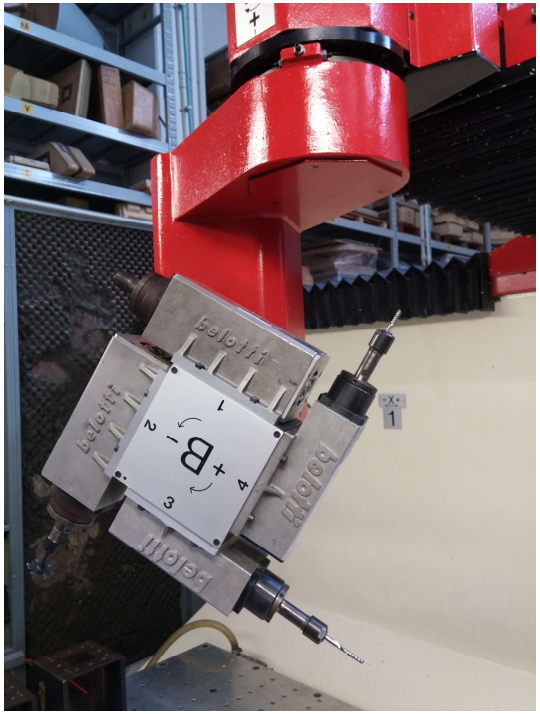
Application: thermoformed milling

CUTTING PARAMETERS		
Material	Plastic	
Cutting tool	mm	D6
Thickness cut	mm	3
Width	mm	6
Cutting Speed	Vt	450
Spindle RPM (S)	1/min	24000
Feed rate (F)	mm/min	6000

Plastic - Termoforming

Application: thermoformed milling for various application sectors





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