

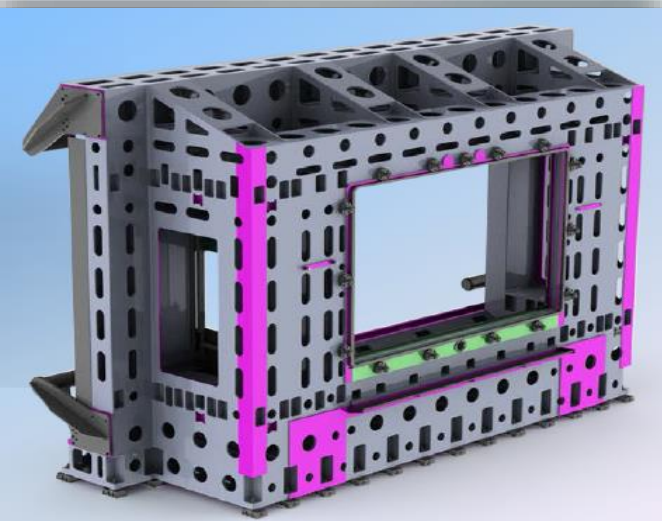


**5 AXIS
HORIZONTAL
MILLING CENTER**

MonnaLisa

Monnalisa is the innovative horizontal 5 axis milling center specifically developed for machining monolithic, structural, large dimension aluminum parts, particularly suitable for aerospace industry applications.





Extremely robust structure, in cast iron

The machine structure is built in cast iron and reinforced in strategic points, giving therefore also great rigidity and dynamics, with the minimal temperature drift. The machine is equipped with PT100 temperature detection, used for any eventual upgrading.



The attention to axis movements

The X carriage consists of a rigid double column in cast iron and it is moved by 4 gearboxes with integrated pinion and 4 brushless motors. The Gantry configuration presents two Twin Drive systems for the recovery of any backlash through an electronic preload.

The Y axis is mounted on roller sliding blocks which slide on guides housed on the axis X fusion; the Z axis is made by a parallelepiped rectified structure which slides on roller sliding blocks, whose guides are housed instead on the Y axis fusion.

The cross system vertical axis/RAM, respectively Y axis and Z axis, is made by two integrated structures Box in Box.

The carriage position is detected by optical encoded and pressurized lines, made by Heidenhain.



| | 30.20 | 40.20 | 60.20 |
|---------------------|-----------------------|-------|-------|
| X Axis | 3.000 | 4.000 | 6.000 |
| Y Axis | 2.000 | 2.000 | 2.000 |
| Z Axis | 1.000 | 1.000 | 1.000 |
| Rapid Speed | Max. 50 m/min. (work) | | |
| Acceleration | 7 m/sec ² | | |
| A Axis | ± 110° | | |
| C Axis | ± 200° | | |
| Rapid Speed | Max. 210°/sec | | |



Easy loading thanks to table rotation

Loading operations are easy thanks to the $\pm 90^\circ$ table rotation obtained by two mechanical arms hydraulically operated, while for the table gripping are used four hydraulic pistons.

The steel working tables have been developed to use vacuum extraction and any system of clamping piece, with a capacity of 2000 kg each plate.



Double working table, pallet change type

The working tables are made by two large dimension working plates, symmetrical (pallet change) to allow replacing of the pieces during the machining cycle.

| | 30.20 | 40.20 | 60.20 |
|-----------------------|------------------------------|----------------------------|----------------------------|
| Working Tables | 2 tables 2000 x 3000 | 2 tables 2000 x 4000 | 2 tables 2000 x 6000 |
| | T-slot 28 mm + fixing holes | | |
| | Tilting 0 to 90° positioning | | |
| | Vacuum predisposition | | |

The movement of the two tables, pendular type, is obtained with carriages moving on a sliding line.

The area of the piece substitution ensure the easiest position to the operator during the replacing's phases, working in full safety.

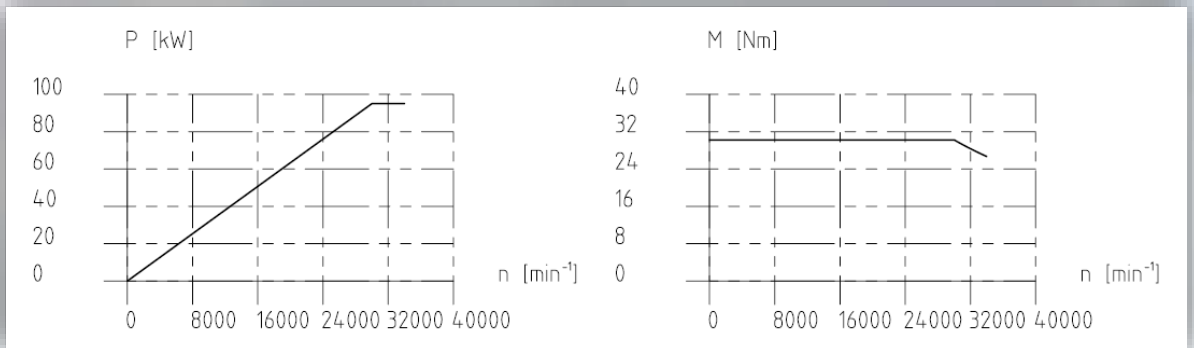


Strong working head

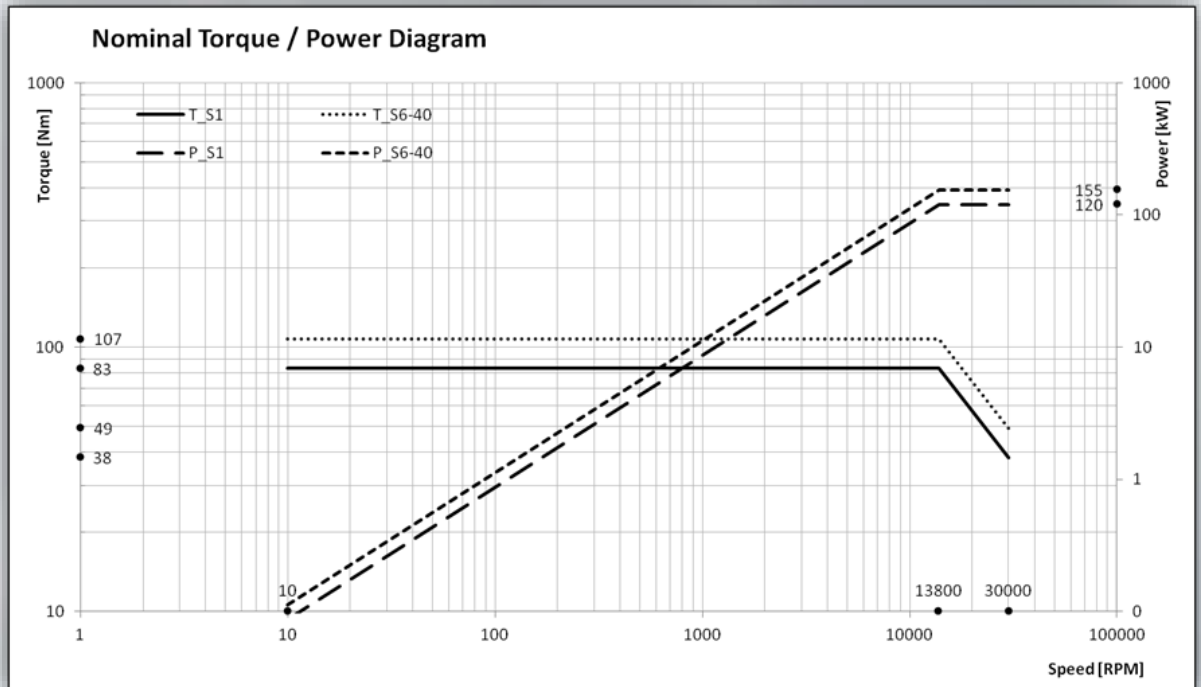
Fork type working head with body manufactured in one piece only and made in cast iron.

The head is equipped with cooling through the tool, air blow cleaning cone, rigid tapping, hydraulic locking / unlocking of the tool holder.

Spindle with 30 Nm Torque



Spindle with 83 Nm Torque





Large capacity automatic tool changer

The rack type tool magazine with 120 tools is fully protected from working chips and refrigerating tool liquid, or simply from dust when not used.

The tools can be replaced even during working cycle.

- Tool-holder type: HSK-F-80
- Tool max diameter: $\varnothing 93$ mm with occupied adjacent position, $\varnothing 150$ mm with adjacent pockets empty
- Tool max length: 300 mm
- Tool max weight: kg. 10
- Time of tool changing: 6 seconds





CNC Numeric Control

High performance release of Siemens 840D SL numeric control.



Process control by video

At the upper corners of the cabin there are 2 lightings and 2 video-cameras, which project images on a monitor screen positioned on top of the operator panel, allowing the process control during milling operations.





Large volume of chips evacuation

Thanks to a large dimension belt chip conveyor (800 mm width, 300 mm height) positioned under the working area, a volume of about 1 cubic meter/hour is evacuated.

It is fitted with walkable grid and with a tank for the liquid collection.

Moreover on the conveyor tank are mounted:

- Coolant transfer pump from the conveyor to the tank equipped with filtration system.
- Bypass valve to bring the high pressure in the tank, in case of passages' clogging.

Both the tank and the conveyor are equipped with floating devices of min. and max. of safety reporting.

The system is equipped with cooling chiller for the temperature control of the coolant.





Ciserano (BG) - Italy



Levate (BG) - Italy



Vigevano (PV) - Italy



Columbus - (OHIO) - USA



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- THERMOFORMING MACHINES
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- PUNCHING MOLDS
- SHEET SINGLE STATION
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THERMOFORMING MOLDS

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