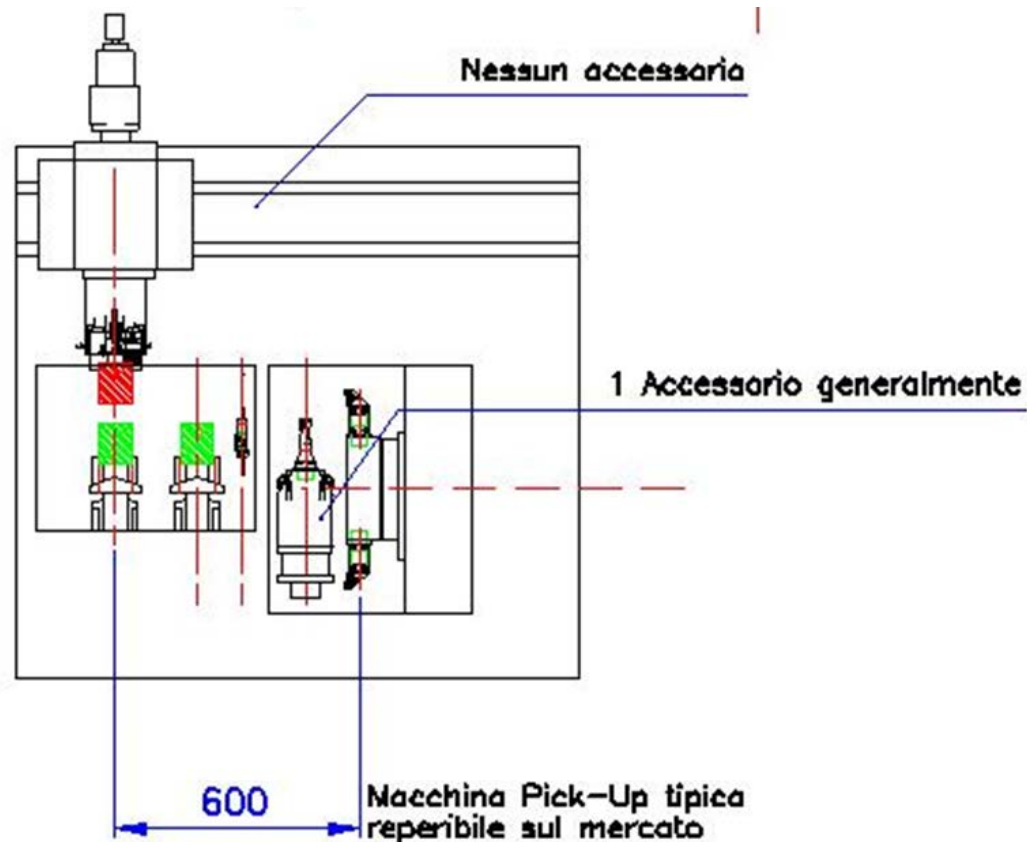


Traditional pick up lathes

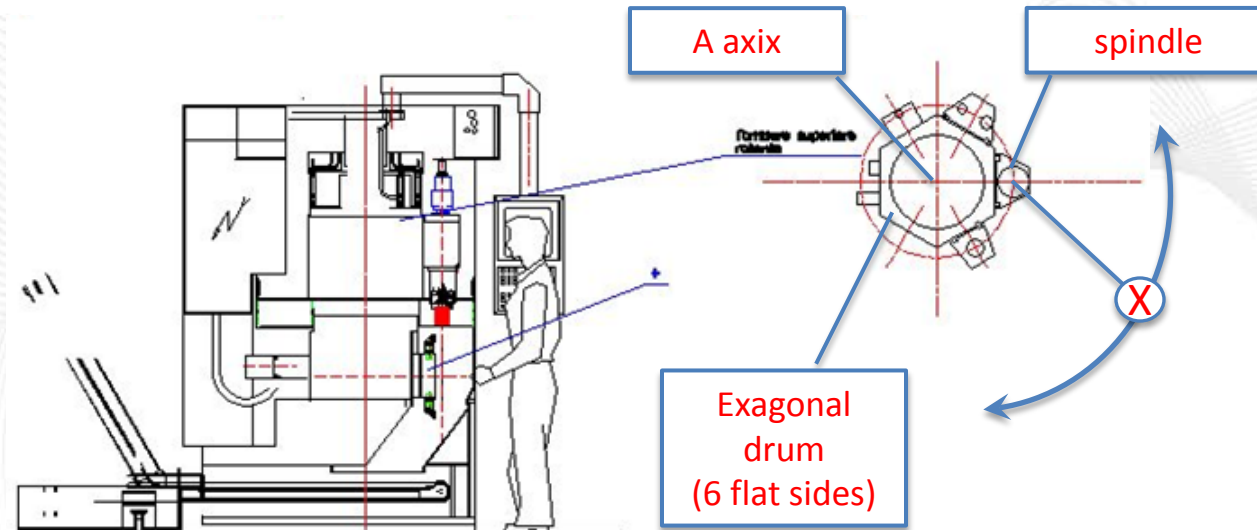
- On the upper side, one wagon is moving along linear X axis, carrying one single spindle
- The spindle runs along the X axis, between the working area and the conveyor system which is integrated into the machine
- The stroke along the X axis is limited by the machine structure (such as the telescopic guards), which do not allow the full utilization of the space to install additional tooling



- To perform additional operations in sequence, the length of X axis should be increased according to the desired number of work stations, with significant increase of the machine size and cost
- When the upper wagon is carrying only one spindle, it has to hold the part in the same specific grip, during all machining operations, without changing position.
- In summary, the traditional pick up lathe suffers 3 basic constraints:
 1. It requires a conveyor system in order to feed the parts to the spindle for their pick up
 2. The relatively small working area allows a limited number of tools, requiring very frequently the installation of a tool changer unit
 3. It is not possible to work the part on the two sides (operations A and B), unless the machine is equipped with two spindles or two machines coupled.

Orbiter Concept

- Orbiter is solving the three major issues of traditional lathes listed above, being able to reduce costs, to increase performances and flexibility.
- The vertical spindle is running along an orbital X axis, instead of linear.
- The upper side of Orbiter is equipped with a drum, rotating around it's central A axis and presenting six different flat sides.
- The pick up spindle is assembled on one of the 6 sides of the drum, therefore the transversal motion of the spindle along the X axis is a circular motion around the A axis of the drum.
- The spindle is fixed to a wagon which is moving vertically (Z axis) in order to work the entire length of the parts.
- All other sides of the drum may be equipped with additional accessories, including a second spindle, based on specific needs, in order to perform the most complex machining work.



Orbiter Concept

- On the lower side, the Orbiter base structure may be equipped with multiple stations distributed along the circular perimeter of the wide working area, such as:
 - ✓ load/unload station
 - ✓ fixed and motorized tooling
 - ✓ special devices for specific and complex operations (grinding, milling, teething gears)
 - ✓ One or more counter heads, allowing machining of phase 2 of the part, at the opposite side respect the main spindle clamping, avoiding additional rotating units and being able to perform simultaneous machining operations of the two phases (normally feasible with a double spindle machine)
- In summary, Orbiter is equipped with a system of spindles and tooling on the upper rotating drum and another system of tooling and spindles (counter heads) on the lower side, fixed to the structure and displayed along a circle.
- In this way, similarly to a bi-dimensional matrix, it is possible to obtain a wide series of combinations between parts and tooling, in order to perform a large variety of machining operations on both sides A and B of the part.
- Up to now, the high flexibility delivered by Orbiter was obtainable only with dual-spindle machines, much larger and more expensive.

