

New ideas for a moving market

To remain competitive in the machine tool industry, it is essential to have new ideas: this is the only way to beat the competition that comes from afar.

In the following article we describe a machine equipped with very interesting innovative features which are attractive for both Italian and foreign users.

It is a new gear shaving machine introduced to the market simultaneously with its presentation at the EMO trade fair in Hannover.

Specialized in the manufacturing and marketing of gear shaving machines, Sicmat (based in Turin) has raised the problem of how to deal with the increasingly fierce competition represented by reconditioned machines and the new proposals by Japanese manufacturers.

At this time of global crisis, the number of small-medium sized companies which are not willing to buy new gear shaving machines because of their high price is increasing. These companies either turn to companies specialized in retrofitting or buy Japanese gear shaving machines which are cheaper than the corresponding European ones.

The high-end machines for gear finishing, whether they are gear shaving or tooth grinding machines, will be continued to be purchased by the major gears manufacturers, but the small and medium producers and those from the emerging markets, particularly China and India, want low-cost machines, without giving up on high performances.

Sicmat has therefore addressed the problem of producing a machine which preserved all accuracy and flexibility characteristics, while costing considerably less than what the gear market has offered so far.

This is how the Sicmat RASO 200 Dynamic gear shaving machine was born: compact, precise, flexible and above all affordable.



Picture # 1 – Sicmat RASO 200 Dynamic gear shaving machine

This has been possible by stripping the machine of everything that was considered superfluous, in other words not essential for high quality production and for low cycle times.

Let us briefly examine what has changed from RASO 200 gear shaving machine.

1) – First of all, a standard machine was developed. That is, a machine which should not be subject to any changes the customer might ask. It is like when you buy a fridge: it's just like that and that's all.

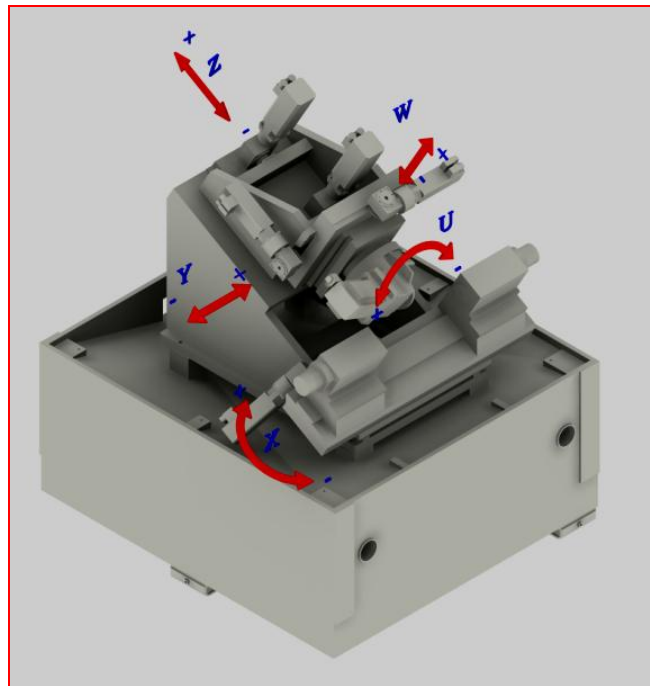
No one is planning to customize a fridge!

The only option which is offered to the customer is the machine with or without automatic loader, but in any case, even this option is standard. This is a great cost savings, both in design and construction.

2) - The second important point is the replacement of Siemens Sinumerik 840 D CNC with the new electronic Siemens Sinumerik 828 D. The latter is the result of the cooperation between Siemens and Sicmat. It is properly designed for this new shaving machine so that it can only handle 5 axes and the rotating axis of the chuck.

If you think that Siemens 840 D CNC could, at best, handle up to 32 axes and the gear shaving machines built by Sicmat were using up to a maximum of 10 to 12, it is clear how it was oversized and how it was possible to considerably cut the final price of the machine.

As for the management of the essential movements required in gear shaving, including those allowing the execution of mixed cycles, 5 axes managed by the CN are enough; it is therefore useless to have useless functions which do nothing but clutter the software and generate higher costs.



Picture # 2 - *Diagram of the axes of RASO 200 Dynamic shaving machine*

3) - The simplification of electronics has resulted in the simplification of the circuits, thus obtaining a less complex and smaller electric cabinet, which saves a little more space in the workshop.

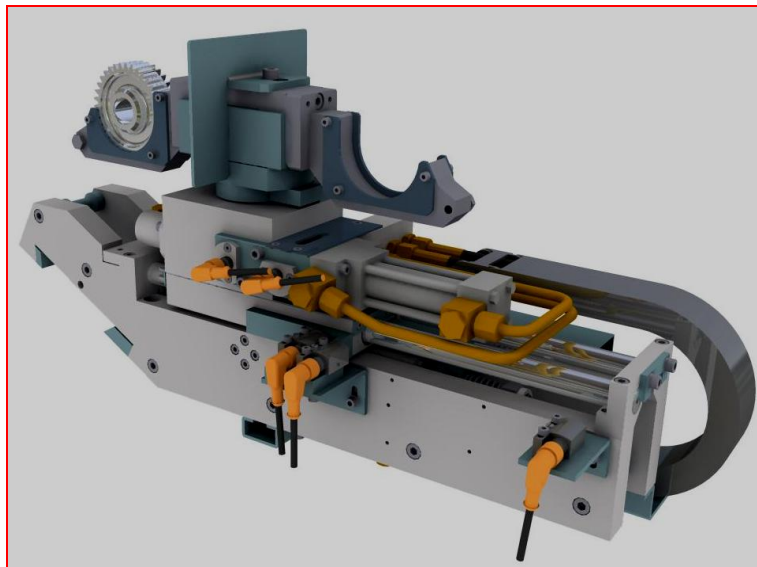
4) - New Siemens motors which maximize the value/price ratio without affecting the cycle time have been applied.

5) - Solutions which reduce the size of the plumbing system, e.g. replacing the hydraulic clamping from the tool holder (lead adjustment) with a magnetic system. This allows a reduction in construction and management costs; this change also has ecological relevance.

6) - Another point significantly impacting on costs and environmental protection, is the removal of the oil-bath gear kinematic chain which linked the motor to the tool holder chuck. The innovation is a gearbox mounted directly in axis with the chuck which requires no additional gears or no drop of oil.

These are the main differences between the new machine and the corresponding machine in use so far (which also continues to be produced), and this has helped to reduce the final price by a good 25%, which now amounts to less than €200,000 including the standard automatic loader.

Well, you would say, but what about accuracy, flexibility on cycles and shaving methods?



Picture # 3 - Standard loader in RASO 200 Dynamic shaving machine

Relax, nothing has changed. The accuracy and the stability of the machine are still the same; the execution speed of shaving is the same, mixed cycles are performed as in the gear shaving machines so far offered by the market, and it is possible to change the working conditions during the same cycle. In short, the performance remains unaltered. Some functions will be surely lost, such as the ability to handle, through the same CNC of the machine, external functions like a complex multi-axis loader, or to manage additional heads for chamfering and de-burring. But all this is not necessary if you do not produce very large product quantities, and if you do, you need to go on using higher-end machines. The new Sicmat RASO 200 Dynamic gear shaving machine may cost slightly more than a reconditioned machine, but it is equipped with much more functionalities and is managed by a new generation numerical control.



Picture # 4 – Gear shaving in the automotive sector performed by Sicmat RASO 200 Dynamic shaving machine

The following table summarizes the main technical data related to the new Sicmat gear shaving machine.

- *Technical specifications of Sicmat RASO 200 Dynamic shaving machine*
- *Number of axes 5 +1 rotating axis (absolute encoder)*
- *Min/Max distance between shaving cutter and piece 120-202 mm*
- *Shaving cutter min/max diameter 178-245 mm*
- *Diameter of the shaving-cutter-holder chuck 63.5 (100) mm*
- *Maximum width of toothed band (diagonal cycle) 100 mm*
- *Numeric Control Siemens Sinumerik 828D*
- *Installed power (including pump and cooling filter) 20 KVA (approx.)*
- *Weight (including electrical cabinet) 4200 kg (approx.)*
- *Voltage supply 400 V - 50 Hz*