



Hybrid without compromise

THE INNOVATIVE LINE OF SPARK MCS BY MANDELLI SISTEMI FINDS ITS COMPLETION WITH SPARK 1200, **BORN TO MEET FLEXIBILITY AND HIGH PERFORMANCE BOTH IN TURNING AND MILLING** THANKS TO AN IN-BUILT ROTARY TABLE INSIDE THE MACHINE BASE, A GUARANTEE OF HIGH ACCURACY.

by Davide Davò and Flavio Della Muzia

Two complementary technologies integrated in a single machine. This is the demanding challenge by Mandelli Sistemi to have a turning/milling hybrid solution in a single MC to provide performances which can be legitimately compared to the ones of traditional systems conceived for the two single operations. A challenge coped with and won with the Spark line machines, added today with the smallest size Spark 1200 which is the outcome of the experience and know how Mandelli has acquired since its beginning in 1932.

Innovative tradition

Since the first machines Positiv, Medal and Thema, through the first system looking more like a machining center, the Ego line, up to the modern and innovative MCs and industrial automation systems, Mandelli, located in Piacenza, has become the reliable and trustworthy partner for many customers around the world towards whom its resources are directed so as to promote

the development of tomorrow's technology. With its widespread network of agencies around Europe and two direct branches in two strategic markets such as North America and China, Mandelli dedicates to industries such as Aerospace, Energy/Oil&Gas and Precision Machining with very versatile systems capable of meeting the requirements of different industrial applications and to evolve over time with new functions as a result of a constant research. Solutions like the new Spark 1200 whose philosophy is the combination of milling and turning operations in the same machine. «This line included models like 1600 and 2100 (the number indicating the size of the workpiece which could be machined) conceived in a revolutionary way: actually, our company was the first in 1991 to make a lathe/milling machine on the concept of a horizontal machining center with model Mandelli 8UT – says Marco Colombi, Sales Manager at Mandelli Sistemi. After 25 years of

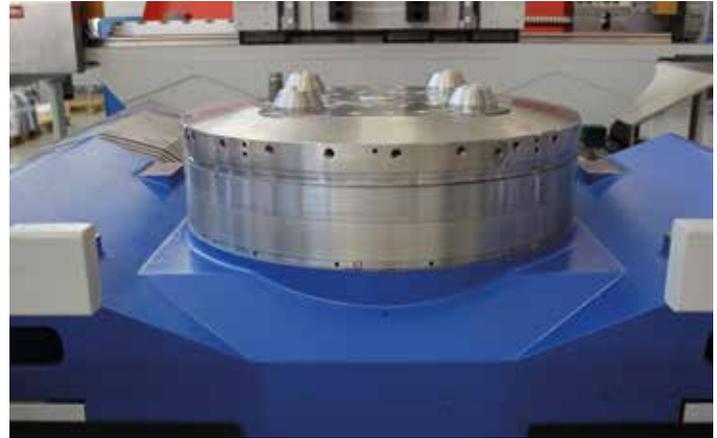
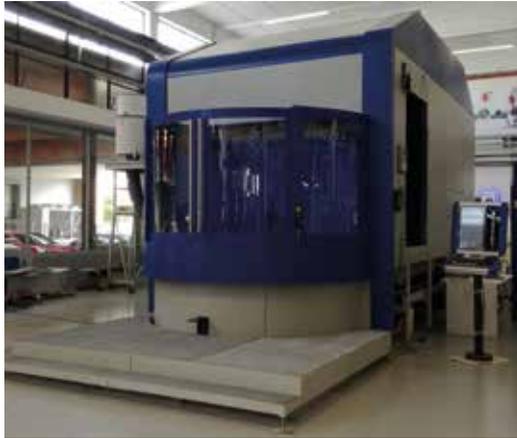
experience on the job, we have decided to dedicate a specific architecture to those machines which can both turn and mill. The peculiarity of this system is the fixed table featuring only the rotary movement while all the linear axes are on the tool side, a characteristic that allows for turning performances just like a vertical lathe thanks to the table built-in the base which guarantees maximum stability and rigidity, that is precision».

Efficiency in every production

Mandelli's decision to introduce Spark 1200 comes from the need for many small/medium size producers to rely on a high level of flexibility and productivity. Our markets today do not really ask for maximum efficiency in turning and milling but flexibility, to be able to reconfigure the systems fast without having large stocks. The trend is to concentrate a lot of technology in the same machining center to improve production processes: actually, if we had to produce today a workpiece requiring

Left : Spark 1200
with a double pallet
APC

Spark 1200
new turning
table can reach
up to 800 rpm in
continuous with a
2000 Kg payload



Maximum dynamics
is guaranteed by the
double ball screw drive
on all the linear axes

30% milling operations and 70% turning ones and tomorrow we had to machine a workpiece featuring the opposite percentage, traditional technologies might cause losses in terms of efficiency. «Spark instead, thanks to its flexibility, guarantees efficiency also when such changes occur. Reducing the number of times when workpieces are moved reduces errors and increases precision, with all the consequent advantages, says Colombi. We have understood that the market is now looking for immediate reaction and high flexibility, even in the presence of small size components (approximately 1m. diameter). This way, with a 70 kW both in turning and milling, the stock removal is exactly the same as traditional lathes or mill cutters».

Performance...

The new Spark 1200 was specifically designed for an aerospace industry engine manufacturer, one of the fields for which this machine size was conceived. Two Spark 1200 machines have been installed to make 900 mm/1÷2 mm thickness seal rings to equip the LEAP engines (Leading Edge Aviation Propulsion) of medium size civil airplanes. «The customer had two major needs: utmost precision for the holes on the flange – around 15 microns – and the possibility to machine very hard materials because those rings have to seal the hot gases produced during the combustion phase and the expansion

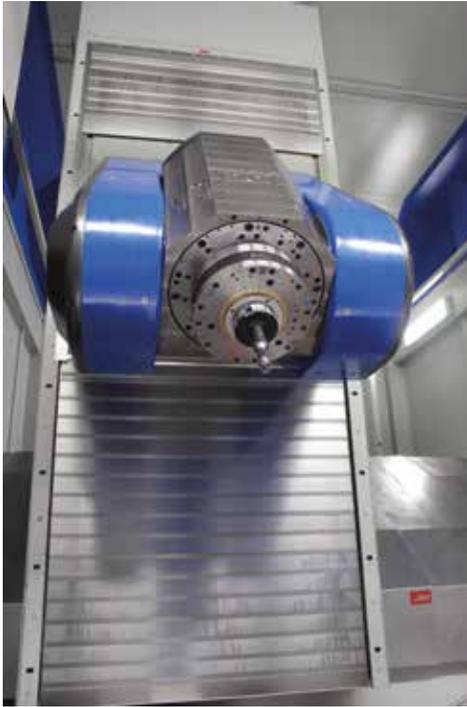
into the turbine - adds Colombi. It is worth mentioning here a new technology that proved to be highly efficient while machining these components, that is the use of high-pressure coolant up to 350 Bar to be able to break the chips and cool the cutting area much more efficiently. This solution, patented by Mandelli, features innovative sealing gaskets that allow the coolant to flow through the head shoulders without applying external pipes which may be either an encumbrance or a dangerous hooking point for chips. In the aerospace industry of the past, much attention was paid to technical solutions whereas others were considered secondary, such as costs. Now both have become major issues so more and more automation is needed especially in unmanned operations. Controlling the chips is now one of the major aspects so that

high pressure can break them to avoid interference with the machining operations.

... and flexibility

An interesting application of Spark 1200 has been made for a customer producing mixing systems for the food industry, a company named Sancassiano, near Cuneo (Italy). They needed to machine different types of stainless steel hard to process and dedicated to the making of thin pieces. «The technology that convinced the customer was the automatic fine tuning of the machining parameters included in our Industry 4.0 iPum@smartcut package. This package detects the dangerous vibration which may damage the tool integrity as well as the component being machined and changes the machining parameters to restore the machine to optimal working conditions – adds Colombi.





Left : new generation compact electro-spindles featuring high torque equip Spark 1200 tilting heads

The new HMI iPum@control panel with large size touch screen

Below : Spark 1200 is suitable for different industries and applications



➤ THE EFFICIENCY OF THE SPARK LINE IS ALSO GUARANTEED **BY CHANGES IN THE TYPE OF PRODUCTION**

These mixer parts, featuring a special shape, could not be stiffened so, upon entering the company facilities, you could hear the noises coming from the machine vibrations. The override was then let into the operator's hands to find the right setting. With our iPum@smartcut, equipped with accelerometers and a SW package that adjusts the machine operating conditions, the customer will easily control unmanned operations too. Among the components machined on Spark 1200, we can find the mixers main kinematic unit, in particular 100 mm dia. shaft drums machined out of a single workpiece with 800 mm dia. drums. These parts can be machined on a single machining center because the turning table can reach high speed rates and the machine can guarantee the necessary high stiffness to machine hard material safely. «With this application, Spark 1200 has met the

production needs of today - ends Colombi – and aligns with Sancassiano's vision of the future in line with the technological innovations on the market. Something that they also showed in their interest towards the additive manufacturing cell we have recently developed». ■