CHIP REMOVAL

mandelli

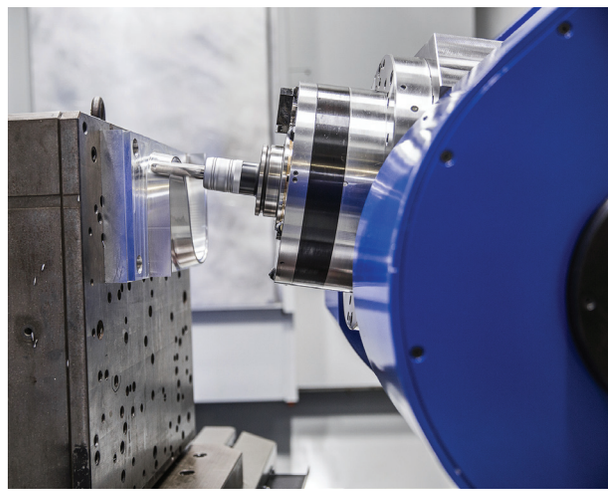
The offer by Riello Sistemi Group includes the main manufacturing technologies, completed by a quick, widespread and direct service in the reference markets.

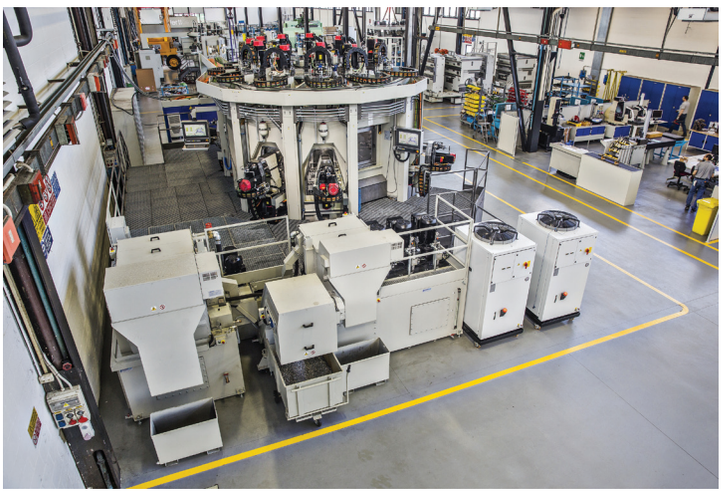
by THE EDITORIAL STAFF

A multitasking PARTNER

Riello Sistemi Group ranks among the primary players in the machine tool sector and holds the top positions of international markets thanks to the constant research and development as well as the use of forefront technologies. Relying on three prestigious brands that boast a long and outstanding tradition in the sector, Riello Sistemi, Mandelli Sistemi and Tri-Way Manufacturing Technologies, Riello Sistemi Group designs and manufactures machining centres, transfer machines and special applications, always completed by the study of new processes and by the realization of the most suitable solutions for satisfying effectively all customer requirements. These are the pillars of the Group's philosophy.
Mandelli Sistemi, which can boast an almost centenary history in the machine tool world, has achieved successful outcomes on the international market designing and manufacturing machining centres appreciated, first of all, for their power, speed, flexibility and precision maintenance in time. In the last decade, besides the stronger and stronger customization, Mandelli has focused its attention on the sectors with higher added value, like Aerospace and Energy, characterized by materials difficoult to machine and complex geometry, requiring high-performance turning and milling operations.
They so conceived the Spark Ti line and the range of Spark Multitasking machining centres, specifically studied for the needs of these two sectors.
Spark Ti is a line of 5-axis machining centres granting both heavy stock removals in roughing and very high-quality surface finishes on the finished piece, thanks to a specifically designed range of heads, to a series of dissipation systems able to reduce vibrations by 75% compared to the standard machining conditions and to a notable coolant flow to the tool that avoids the precocious wear.
Materials like titanium and HRSA in fact, largely used in the aerospace industry due to the mechanical characteristics exceeding steel ones coupled with more lightness, are affected by some negative features for stock removal machining, like for instance the scarce thermal conductivity, which imposes the use of low cutting speeds and at the same time high torque, to avoid critical vibrations that would risk of causing the machine resonance.
Moreover, the choice of HSK 100 or 125 tool tapers assures a high coolant flow to the tool, thus granting minor wear as well as an adequate chip removal. All these features make Spark Ti models very suitable for machining structural components in the aerospace industry, such as for instance landing gears, engine mounts, flap/slat tracks.
The Spark Multitasking machining centre can instead shift automatically from operations with rotary tool to the typical machining operations of a vertical lathe. In the new turning/milling machine models, solution with which Mandelli has been present on the market for over 25 years, the company has preferred a fixed-table configuration that allows for optimal performances in stock removal and in machining precision, with a loading/unloading station that permits the piece centring outside the machining area to maximize the system efficiency.

With a special focus on aerospace manufacturers' productive requirements, Spark Multitasking has been recently equipped with solutions that enhance its manufacturing potentialities, like an extension for deep turning, a robust head with angular transmission and automatic tool change for radial machining and the possibility of loading facing heads on the tilting axis; these options have been specifically developed for the machining of aerospace engine components: engine cases, blisks, IBRs, rings, diffusers. In addition to the developments in the hardware area, the Piacenza-based company and Riello Group are working at the software part as well, in a phase of great evolutions in the ambit of the paradigm of Industry 4.0 and IoT (Internet of Things) areas.
The new industrial revolution, a term created in 2011 but encompassing concepts already under analysis by the major automated machine manufacturers, is now experiencing a very strong acceleration, made possible by the availability of the data transmission band inside companies and of more and more effective calculation and analysis instruments of experimental data in cloud mode.
In that way, in a successive phase of the operation, the remote system control allows for further optimization of machinery that must be at the same time increasingly complex, efficient and easily managed even in unmanned mode.
Mandelli Sistemi is working at the Smart Factory issue according to three main directives: control connection/remoting, machining centre sensoring, development of a self-diagnostics system for predictive maintenance.
The net-connected machines will be then monitored remotely, by both the manufacturer and by the internal maintenance department while, thanks to augmented reality functions and a dedicated APP, it will be easier for the operator and the maintenance technician to diagnose and correct failures. The rising number of sensors, coordinated by devices able to collect and send an enormous quantity of data to the server, will enable the software to calculate with very low uncertainty a future machine breakdown, so that their maintenance can be programmable in time and only if necessary. Such software will be based both on statistical data collected on the job and on mathematical models of the parts subject to wear.
The availability of information about the use of their own machines will become then essential for manufacturers to understand their customers' real requirements and will exert positive repercussions also on the optimization in the design phase.
It stands out among the product novelties the new Smart Controller





device, an intelligent system for the vibration control matching the business strategy Industry 4.0. Thanks to a series of sensors positioned on the entire machining centre, such as in particular the accelerometer installed on the spindle and the hydrophone mounted inside the machining area, the device sends all machining data/signals to a calculation unit that, without requiring the operator's intervention, processes them autonomously to re-calibrate them, when necessary, granting the most correct operation of the machining centre in terms of Spindle Speed Variation, modulated according to a sinusoidal law, and Spindle Speed Tuning, based on the smart choice of the best speed for the absence of vibrations.

Riello Sistemi (the parent company established in 1963), is a company of international renown in the manufacturing of flexible cells and transfer machines with conventional rotary-table, bar and flexible ones. The main outlet sectors of these machines are automotive, industrial and sanitary fittings, valves and mechanical components in general.

HORIZONTAL-AXIS STANDARD TRANSFERS AND VERTIMAC

Over 2,000 machines sold and installed. Conventional transfers, with a number of stations that can reach 14, address users that machine piece families whose size is indicatively contained in a machining area of 200 mm, with high output volumes. The flexibility of the productive solution, short cycle times, the low piece/cost ratio and the high customization level represent the main characteristics of standard transfers that can machine manifold materials from brass to aluminium up to the various types of stainless steel.

Conventional horizontal-axis transfers with bar loader allow the machine to be loaded with hexagonal and/or round bar loaders of different sizes and rigidity, according to the bar length and diameter. Flexible TFL and VFX transfers, in their various models, combine all the peculiarities of standard Transfers with the flexibility provided by the rotating piece-clamping tools.

Through the rotation of the part under machining, the flexible transfer becomes a flexible as well as easily retooled machine, machining parts with different sizes but belonging to the same family, as well as fully different pieces. The working area is typically a cube with 500 mm-side. Equipped with rotary clamps, rotary self-centring chucks, fixed units and 2-3 axis modules – single-tool or equipped with tool change turrets from 2 or 3 up to 8 pockets – they are production cells perfectly equalling fleets of machining centres but with much more competitive machining costs.

TRI-WAY MANUFACTURING TECHNOLOGIES

Situated in the heart of the American automotive district, in Windsor, close to Detroit, it is a company established in 1977 specialized in the supply of plants for car components. It joined the Group in 2005 and it is the reference partner for sale, service and retrofitting on the American market.

RIELLO SISTEMI CHINA

Riello Sistemi Shanghai is the Group's answer adequately facing the globally growing market needs. A sale and service structure that since 2002 has contributed to consolidating the image of the Group brands in the South Asia area and to acquiring important customers in the most advanced sectors from the technological point of view, ranging from "Tier 1 automotive" to the major aero-engine manufacturers. Italian technological core and global presence, both with direct branches and through partnerships with local companies able to supply the market with the same quality and efficiency of the technicians coming from the parent company: Gruppo Riello Sistemi has been working for 80 years to provide its customers with the best possible solution.