Gundrilling and milling

in synergy

BB-Evo is the new series of work centers specifically designed and developed by the Italian manufacturer I.M.S.A. to work in unison with already well-known deep drilling capacities and improved milling performance, with the objective of continuing to better satisfy preliminary processing and completion of holes.

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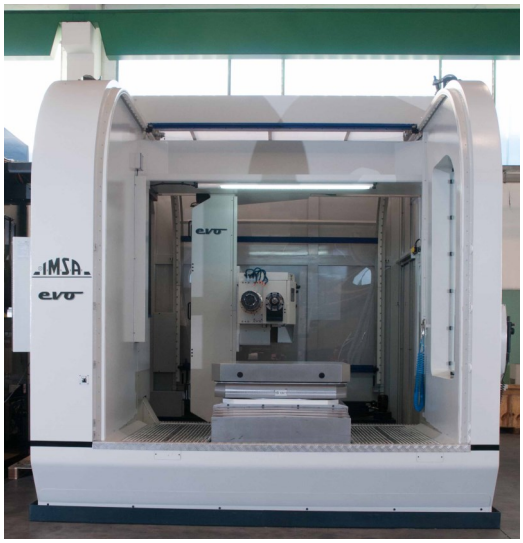
In a market that is ever more competitive and complex, the expansion of a product range must often be accompanied by added value, in order to integrate new operating opportunities with better performance. In pursuit of this line of logic, I.M.S.A. has developed a new series of machines, which in addition to guaranteeing the highest possible performance in gundrilling also combine important technical features in milling for all preliminary processing and completion of deep drilling. "This means being able to provide an even more complete and high performance work center, which can expand upon the available processing options from the point of view of renovating technical resources, as well as further operating opportunities in structured workshops, and as a response to new dynamics underway in the national and international industrial molds sector," explains Luca Picciolo, I.M.S.A. Sales Technician. The new model, called MF1450BB, constitutes the latest evolution of the concept behind the BB series proposed by I.M.S.A., the well-known and very successful range of high-tech gundrilling centers for mold manufacturers using complex cooling circuits, and is the first to be part of the new BB-Evo series. "This evolution continues to maintain the two drilling and milling units distinct and independent from one another, ensuring a winning formula for

The new deep drilling center MF1450BB.



MF1450BB ensures drilling depth in a single cycle up to 1,450 mm, drill diameters 5-40 mm solid.

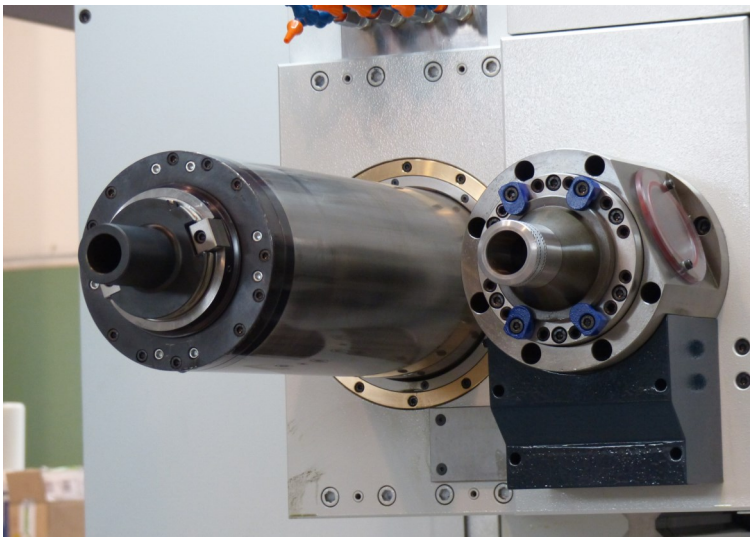
management, functionality and performance logistics, not an innovation for the company, but instead consolidated cutting edge practices mastered for over a decade," continues Picciolo. Distinct and independent units, therefore, designed and constructed to satisfy precise operational requirements, which in short, are: deep drilling up to 1,450 mm in a single cycle, diameters from 5 to 40 mm; milling for processing and preparation and completion of holes (reaming, pocket-milling, threading, etc.), with horizontal milling stroke of 1,050 mm obtained by combining the ram stroke (axis W 600 mm) and the stroke of the milling shaft (axis Z 450 mm). Another factor adding technological value to the new center is the addition of transfer movement of the table (axis U) to facilitate management of the 4 faces; this is an important advantage when working with both large and small size pieces.

Specialists in gundrilling

High performance operations with gundrilling method of the new MF1450BB are still the central focus for ensuring return on investment for a machine of this type, with new mechanics combined with 8-9 available axes to provide superior technical specifications in respect to previous models, also thanks to a new spindle with power from 11 kW for 4,200 rpm. Starting from the unique, exclusive "gantry" structure (portal), supported on the bottom and the top, built with a normalized electro welded metallic structure, providing 16 times more rigidity in respect to the traditional configuration (column guided and supported only on the bottom), it ensures a reliable process and rapid processing. These special technical features ensure drilling depth in a single cycle (axis V) up to 1,450 mm, optimum diameters from 5 - 40 mm (minimum-maximum), with column (axis X) and longitudinal movement that can reach 2,250 mm, an actual longitudinal stroke (axis X) up to 2,010 mm, for a maximum center distance of drilling and milling spindles of 240 mm. The vertical movement of the processing ram (axis Y) can reach 1,500 mm, with a headstock stroke (axis W) of 600 mm, and inclination of the processing unit (continuously) from -20° to +20°.

High performance milling

The new MF1450BB, in addition to ensuring high productivity in gundrilling processes, was specifically designed to also offer high performance during the milling stage, to satisfy the needs of all preliminary processing and completion of deep holes on independent axis. In this regard, an ISO 50 milling head with 29 kW power and 6,000 rpm was installed on the milling unit, for maximum torque of 200 Nm. An automatic tool changer feeds this processing phase, which according to specific requirements can be numbered from 20, 40, 60 or 80 po-



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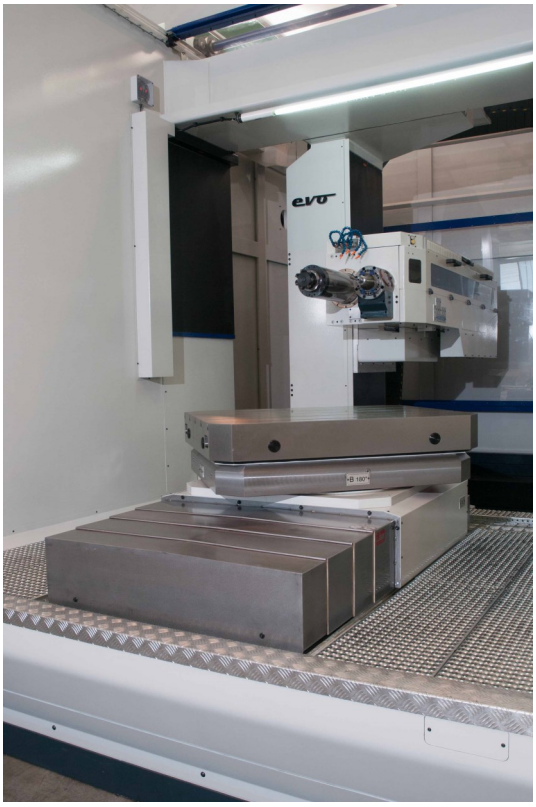
The added value of working all 4 faces of the piece

Thanks to an increase in the horizontal strokes (axis W) and the milling shaft, combined with the addition of the table transfer axis (axis U), the new MF1450BB by I.M.S.A. also increases the strokes advancing to the piece, with significant improvement in piece processing on all four faces. These technological details result in marked advantages during the processing of both small and large pieces. In fact, in the first case the table center moves towards the work center; in the second case, when the piece is so large that it exceeds the geometric limits of the table, it is possible to move the table center away from the machine, placing the surface of the mold in the best possible position for the work unit (both drilling and milling). The work table (rotary-transfer) is in normalized ductile and rectified cast iron, with dimensions 1,200 x 1,500 mm, axis U with 500 mm stroke, ensuring maximum capacity in rotation (centered) for pieces with maximum weights of 12,000 kg.



The available axes strokes enable easy piece processing on all its four faces.

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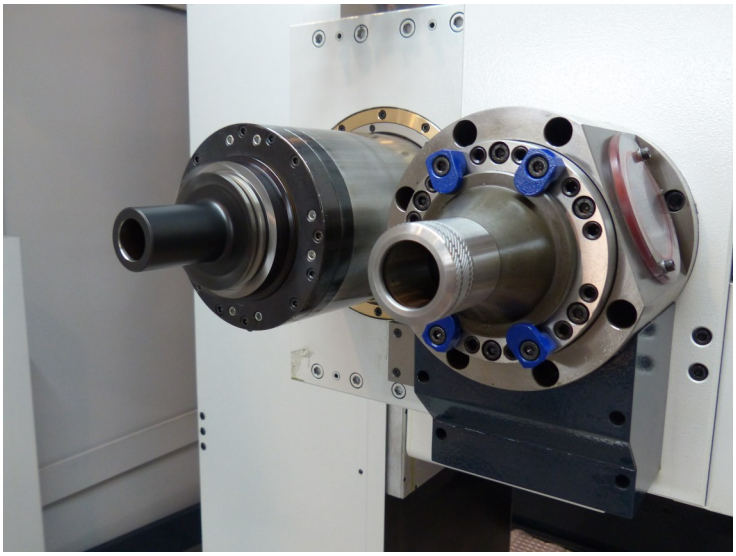
sitions (maximum admissible length of the tool up to 350 mm, with diameter up to 100 mm and maximum weight of 25 kg per single tool), guaranteeing maximum flexibility. The technological updating carried out by the I.M.S.A. technical department is therefore not an operational compromise, but instead a clear intention to offer a complete package that is able to satisfy precise needs pertinent to the aforementioned gundrilling and milling processes. Constant performance over time is also guaranteed through a new, high performing liquid cooling system (replacing the air system installed in the previous models); the choice allows reducing to a minimum (if not completely) heat dilation on the axis Z when working within established tolerances. Process optimization and efficiency, like in the entire BB series created in 2000, are evident in the passage from the gundrilling operation to operations with the milling spindle, which takes place completely automatically with function M, requiring only enough time for the electronic switching of the axis, without any direct intervention by the operator necessary.

Process monitoring and control

The new MF1450BB is controlled by a Heidenhain TNC 640 numerical control unit,

Heidenhain TNC 640 control has been equipped with specific deep drilling cycles and coordinate transformation functions

equipped with specific functions and work cycles for gundrilling and transformation of coordinates for slanted drilling. In fact, I.M.S.A., together with the Heidenhain technicians, has designed specific cycles for their machines, with the precise objective of providing dedicated processes while managing PLC parameters according to a traditional method. In other words, a “customer care” cycle that can be implemented like a regular standard cycle. For example, one of these cycles handles control and monitoring during the gundrilling phase, guaranteeing safety through dual electronic control of cutting parameters on the head. The cutting power and/or advancement power can be programmed by the operator, and if these settings are surpassed an alarm is visualized and the machine stops. Another dedicated function is the management of the non-regular orthogonal drilling headstock, or drilling at a tilted angle. This operation is carried out by orienting the horizontal axis (axis Z) and not, as traditionally happens, through the use of rotating axes (such as, for example, those in heads and tables). This need was the basis for creating specific procedures, calculating the geometry of the position of the tool head in space (Static RTCP), and creating special cycles that allow dual inclination working processes in total safety according to preset process quality standards.



The passage from the deep drilling to operations performed by the milling spindle takes place completely automatically, without any intervention by the operator necessary.

Productivity and efficiency without oversight

As previously stated, the new MF1450BB, even though designed to meet the needs of gundrilling operations, also has technical features that offer performance and flexibility in milling operations for all preliminary and completion tasks for deep drilling. Productivity and efficiency are the cornerstones of the basis on which I.M.S.A. proposes a valid solution for an even greater range of users. Offering high productivity, combined with a high quality process that requires no oversight and with a single piece cycle. The automatic procedures, mechanics and cutting edge technologies of the new machine translate into elevated efficiency, and subsequently longer duration for tools. Without forgetting the possibility of managing alternating gundrilling and milling operations, optimizing space and work shifts, also facilitating processes on all four sides of the piece, allowing the production line to produce a piece ready for production of the mold.