Machining Center Features Increased Speed, Power, and Versatility

MDT Staff

Mazak Corporation made several key performance enhancements to its next-generation Horizontal Center Nexus (HCN) 4000-III Horizontal Machining Center. As a result, the machine delivers significantly increased amounts of productivity and cost effectiveness, especially for those shops looking to implement horizontal machining centers as go-to workhorse machines for high-volume part processing operations.

Key performance enhancements include those that shorten part cycle times and allow the HCN 4000-III to handle an even wider variety of part sizes and more parts per setup. Faster rapid traverse speeds and acceleration rates, shorter chip-to-chip times and increased tool size capability are what contribute to reductions in cycle times. While, greater part size versatility and parts per fixture result from the HCN 4000-III's expanded Y-axis travel/stroke, as well as a higher allowable thrust in its Z axis.

Rapid traverse speed on the HCN 4000-III is now 2,362 ipm (60 m/min), and machine acceleration rate went from 0.8G to a faster 1G. Mazak also shortened the machine's spindle acceleration speed to only 1.3 seconds for its standard 12,000-rpm spindle and to 1.5 seconds for an optional 18,000-rpm spindle.

For fast, efficient and versatile machining of a wide variety of materials from steels to nonferrous metals, Mazak also offers 14,000-rpm and 30,000-rpm spindle options for the HCN 4000-II. The four available integral motor spindle types – standard, high torque, semi-high speed or high-speed – allow users to match spindle performance to their specific machining requirements with the proper speeds and power.

The standard 40-taper 12,000-rpm spindle provides power and speed for general machining applications, while the high-torque heavy-duty 40-taper 14,000-rpm

version generates 88 ft-lbs of torque at a continuous rating to a maximum of 223 ft-lbs to increase metal removal rates for hard to machine materials. With maximum speeds of 18,000 rpm and 30,000 rpm, the 40-taper semi high-speed and HSK high-speed versions allow for faster machining and superior surface finishes when cutting aluminum and other nonferrous workpieces.

To further slash part cycle times, the HCN 4000-III performs chip-to-chip tool changes in only 2.4 seconds, a significant reduction from its original time of almost 3 seconds. The machine's maximum tool size capacity has also increased from 5.9" (150 mm) in diameter to 6.7" (170 mm) in diameter, allowing for the use of larger tools and, thus, faster metal removal for even shorter part cycle times.

Mazak has equipped the HCN 4000-III with a standard 40-position tool storage magazine and, as optional, offers 60-, 80-, 120- and 160-postion magazines in addition to its Tool Hive magazines with either 180, 240 or 330 positions. The large tool storage capacity of the HCN 4000-III means shops can handle a wide variety of parts and perform continuous unattended machining over long periods of time.

Enhancements that expand the HCN 4000-III's range of part size and capacity capabilities are a Y-axis stroke extended from 24.8" (630 mm) to 25.2" (640 mm); an allowable thrust level at maximum Z-axis height raised from 7,749 ft-lb to 8,487 ft-lb; and a Z-axis thrust restriction height increased from 15.74" (430 mm) to 19.68" (500 mm). The expanded Y-axis stroke helps increase productivity by giving shops the ability to process larger parts and greater amounts of smaller individual parts fixtured in taller-sized tombstones. And in conjunction with the Y-axis increase, the higher Z-axis thrust level and restriction height ensure machining forces are equally strong at both the tops and bottoms of large workpieces or tall tombstones.

For automated operation, a standalone robot can be used to load and unload the HCN 4000-III. Plus, the machine is easily incorporated into Mazak's PALLETECH Automation System. Available in one or two level configurations for the HCN 4000-III, the PALLETECH system provides the flexibility for shorter product lifecycles, reduced in-process inventory, and just-in-time production, as well as completely automated, lights-out Done-In-One cell manufacturing.

The HCN 4000-III features the MAZATROL MATRIX 2 CNC control that simplifies the machine's multi-tasking operations. Conversational part programming can be accomplished in MAZATROL language while the machine is cutting another part, or off-line in a CAD/CAM system. Once imported into the control, a realistic 3D cycle simulation verifies the machining cycle and checks for machine interferences, greatly reducing set up time.

Additionally, Mazak has improved the HCN 4000-III's ergonomics with a new Ken Okuyama machine design that emphasizes ease of access and operation. Wider door sizes provide easy access to parts and machine pallets. A centralized maintenance area – relocated from the magazine side to the operator's side – arranges valves and daily inspection items in one convenient location.

For more information, visit www.mazakusa.com [1].

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