

Press Release

August 7, 2014

i 50 High-Speed Horizontal Machining Center for Mass Production Revolutionizing Automotive Parts Machining

DMG MORI SEIKI CO., LTD. (Hereinafter, DMG MORI SEIKI) will begin taking orders for the i 50, a high-speed horizontal machining center for mass production parts machining, on August 7, 2014. With the addition of the new machine, DMG MORI SEIKI now offers a full lineup of models designed for machining the five major automotive engine components called "5C*."

The i 50 is a No. 40 taper horizontal machining center ideal for machining automotive cylinder heads and blocks. Designed with a structure optimized for these workpieces, the i 50 achieves both high-speed machining and space saving, thereby providing far greater productivity per unit area. Having a host of features such as two table variations and high flexibility for mass production lines, the i 50 brings high added value to its users.

We would like to highlight the main features of the i 50 from the perspectives of: (1) Space saving, (2) High-speed machining, (3) High rigidity, (4) Table variation, (5) Chip disposal, (6) High-efficiency workpiece transfer, (7) Energy saving, and (8) Safety.

(1) Space Saving

By narrowing down target workpieces to cylinder heads and cylinder blocks and employing no APC, the i 50 has achieved an extremely compact body with a machine width of 1,680 mm. Thanks to the small width, multiple i 50 machines with a gantry loader (workpiece transfer) system can be lined up with a pitch between machines of 2,090 mm, enabling the users to create a mass production line in a smaller space. Additionally, the machine front height was lowered to the utmost limit so that a gantry loader can be installed at a lower position. As a result, the vertical stroke of the loader is shortened and workpiece transfer time as well as cycle time is reduced.

(2) High-speed Machining

The i 50 employs a spindle that moves on the three axes (X/Y/Z) and lightweight moving parts on the Z-axis to offer high speed machining. A rapid traverse rate of 62 m/min, the fastest in its class, is achieved on all of the axes, and a maximum acceleration of 0.7 G is made possible on the X and Y axes. As for the Z-axis on which a drilling or tapping cycle is repeatedly performed, a maximum acceleration of 1.0 G can be attained. The high acceleration resulting from the lighter moving parts ensures significant reduction in machining time. The spindle also boasts superior acceleration, with an acceleration time from zero to its maximum speed (12,000 min⁻¹) of 1.0 seconds. The A-axis equipped with a DD (direct drive) motor provides high speed indexing, with a 90-degree indexing time of 2.5 seconds (including clamping/unclamping time).

* 5C: Cylinder heads, Cylinder blocks, Cam shafts, Crank shafts and Connecting rods

(3) High Rigidity

A light and high-rigidity machine structure is achieved by FEM analysis. The thick, yet lighter bed employs a slant structure to fully endure cutting load in the Z-axis direction. This ensures rigidity sufficient for the model with a spindle that moves in three directions. Even boring of cylinders, which is high-load, can be performed without any problems. The high-rigidity bed allows a stable installation with 3-point support, enabling horizontal adjustment of the machine and drastic reduction in installation time. What's more, the machine is not affected by secular change.

(4) Table Variation

We offer two types of tables that can contribute to increasing customers' productivity: the A-axis specification and the B-axis specification (option). The A-axis specification with a built-in DDM (Direct Drive Motor) minimizes vibration because there is no backlash, ensuring high-efficiency machining. The A-axis specification comes with a table with a size of 640 mm x 500 mm and a max table loading capacity of 250 kg. The model can handle workpieces with a width of up to 640 mm and has a max swing diameter of $\phi 620$ mm. The B-axis specification comes with a table with a size of 500 mm x 500 mm and a max table loading capacity of 400 kg. The model can handle workpieces with a height of up to 700 mm and has a max swing diameter of $\phi 700$ mm. We are also working on the design for the table of the AB-axis specification.

(5) Chip Disposal

The machine offers excellent chip disposal thanks to the slanted internal covers and the center trough structure. The use of a fixed table made it possible to place the ball screw and the linear guides on the spindle side rather than under the machining area, contributing to reducing the risk of mechanical damage caused by chips. The structure that prevents chip accumulation inside the machining area helps minimize machine downtime.

(6) High-efficiency Workpiece Transfer

High-efficiency workpiece transfer systems such as a roller conveyor for manual transfer and a gantry loader for automatic transfer are available. Customers can choose the ideal specification according to their production needs. As for the gantry loader specification, we have successfully reduced loader cycle time by shortening the vertical stroke of the loader and reducing the open/close time of the shutter to less than 2 seconds. The reduced cycle time, coupled with the machine's compact footprint, allows for the construction of highly productive machining lines.

(7) Energy Saving

The latest, energy-efficiency NC unit and LED lighting are used to reduce environmental burden and running costs. In addition, power supply to the servo motors and the coolant pumps is cut off when the machine is on standby, contributing to energy saving.

(8) Safety

The i 50 complies with safety standards all over the world, including ISO standards, IEC standards, UL standards and JIS standards.

DMG MORI SEIKI will continue to provide products that are reliable, highly functional and worthy of investment to meet each and every customer's needs.

Type	High-speed horizontal machining center for mass production parts
Model name	i 50
Market	Automotive industry
Order starts	August 7, 2014
Production	50 units/month

■ Main specifications

Item		i 50
Axis travel (X/Y/Z)	(mm)	500/550/500
Axis travel (A, B)	(°)	360
Table working surface	(mm)	640×500 (A-axis) [500×500 (B-axis)]
Table loading capacity (incl. fixture)	(kg)	250 (A-axis) [400 (B-axis)]
Max. workpiece swing diameter	(mm)	φ620 (A-axis) [φ700 (B-axis)]
Rapid traverse rate (X/Y/Z)	(m/min)	62/62/62
Max. spindle speed	(min ⁻¹)	12,000
Spindle drive motor	(kW)	37/22 (15% ED/cont.)
Tool storage capacity	(tools)	20 [40]
Floor space (W×D)	(mm)	1,680×3,932

[] option



Photo 1. Exterior



Photo 2. Cylinder block machining



Photo 3. Line production specification



Photo 4. Gantry loader specification