MORI SEIKI
THE MACHINE TOOL COMPANY

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Press Release

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The Release of the NMH6300 DCG 5-Axis Machine, with the World's Best Rapid Traverse Rate and Positioning Accuracy using the Rotary Spindle

A Horizontal Machining Center for 5-Axis Machining with a DD Motor on the A and B Axes

Mori Seiki Co., Ltd. have started taking orders for the **"NMH6300 DCG"**, the high-rigidity, high-precision, horizontal machining center for 5-axis machining which is packed with their latest technology. (Fig. 1, Fig. 2)

In response to the demand for a 5-axis machine from manufacturers of F1 engines, aircraft parts and dies and molds, the NMH6300 DCG is a horizontal machining center for 5-axis machining of medium and large workpieces which offers excellent surface quality and high precision.

One feature is the use of Direct Drive motors (DD motors) on the A and B axes (Fig. 3) of the tilting table, which allow zero backlash and high-precision positioning. With actual measurement values of **0.6" (sec.) on the A-axis and 0.3" (sec.) on the B-axis**, it has achieved the world's highest level of positioning accuracy. Also, since there are no parts such as worm wheels and gears to suffer wear and tear, as there were in conventional machines, high speed and long life has been made possible. The maximum rapid traverse rate is 3.6 times greater than that of earlier models (for the A-axis, Table 1).

To guarantee high precision, **"DCG^{TM} theory"** ("Driven at the Center of Gravity") has been used for the X, Y and Z axes, controlling vibration during feed axis acceleration and deceleration and at the tool tip and ensuring high-quality machining. What's more, the combination of A and B axes with DD motors, allow a level of machining precision which could not be achieved on conventional machines, and as well as a reduction in machining time.

Mori Seiki Co., Ltd. presents a high-speed, high-precision, 5-axis machine, full of new technology, for 5-axis machining of complex shaped parts.

Type	Horizontal machining center for 5-axis machining
Model	NMH6300 DCG
Market	Automobile test parts, aircraft parts, large dies and molds, etc.
Orders from	1 June 2006
Production	2 units/month

■ Main features

1. Equipped with DCG^{TM} (Driven at the Center of Gravity)
2. Maximum workpiece size φ1,000 x 850 mm
3. Travel　1,400 x 1,200 x 1,200 mm (X, Y, Z axes)
4. Maximum spindle speed of 10,000 min^{-1}, with an option of 15,000 min^{-1}

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■Features

1. Equipped with DCG™ (Driven at the Center of Gravity)

The NMH6300 DCG is equipped with DCG™ (Driven at the Center of Gravity), and reduces machining time, extends tool life and improves machining accuracy, quality of the machined surface and contouring accuracy. It uses two ball screws with synchronized control in both the Y- and Z-axis directions, so it is possible to push moving objects at their notional center of gravity. As a result, there is little vibration during acceleration or deceleration, excellent accuracy and high-speed axis travel.

2. Maximum workpiece size φ1,000 mm x 850 mm

The NMH6300 DCG has a □630 mm pallet, and can machine a maximum workpiece of φ1,000 x 850 mm. Its 800 kg loading capacity allows machining of large workpieces, and is also strong enough to conduct cutting of block material.

3. Travel 1,400 x 1,200 x 1,200 mm (X, Y, Z axes)

Axis travels are set at 1,400 mm for the X-axis and 1,200 mm for the Y and Z axes. The rapid traverse rate is 50,000 mm/min.

It offers high-speed parts machining with fast axis travel and reduced non-cutting time, in spite of its large stroke.

4. Maximum spindle speed of 10,000 min^{-1}, with an option of 15,000 min^{-1}

The NMH6300 DCG is equipped with a BT50 tool shank. A 10,000 min^{-1} spindle is standard, and an 8,000 min^{-1} high-torque type and a 15,000 min^{-1} high-speed type are also available as options.

■ Actual measurement data (Table 1)

	Actual value	Conventional machine	Difference
A-axis rapid traverse rate	20 min^{-1}	5.5 min^{-1}	3.6 times faster
A-axis indexing time (90°)	0.91 sec.	2.9 sec.	3.2 times faster
B-axis rapid traverse rate	100 min^{-1}	11.1 min^{-1}	9 times faster
B-axis indexing time (90°)	0.83 sec.	2.5 sec.	3 times faster
A-axis positioning accuracy	0.6″ (sec.) (Note 1)	-	-
B-axis positioning accuracy	0.3″ (sec.) (Note 1)	-	-

(Note 1) The guaranteed value is 3″

■Main specifications

Travel (X, Y, Z axes)	1,400, 1,200, 1,200 mm
Travel (A-axis)	+30～-120°
Travel (B-axis)	360 °
Table working surface	630 × 630 mm
Table loading capacity	800 kg
Max. swing of workpiece dia. × height	φ1,000 × 850 mm
Max. spindle speed	10,000 [8,000] [15,000] min^{-1}
Type of spindle taper hole	No. 50
Rapid traverse rate	50,000 mm/min
Type of tool shank	BT50
Tool storage capacity	60 [140] [180] [230] [240] [330] tools
Max. tool diameter (without adjacent tool)	φ110 (φ320) mm
Max. tool length	800 mm
Max. tool mass	30 kg
Spindle drive motor (30 min./cont.)	37/30 [30/25] kW

[ ] Option

■Other

1. The DCG™ theory (Driven at the Center of Gravity) received the 24th Technology Development Award from the Japan Society for Precision Engineering.
2. The NMH6300 DCG has already received orders for 6 units, as of May 31, 2006.
3. The machine will be displayed at the “Summer Productivity Show 2006” at our Iga Campus from June 22 to June 24, 2006.

Fig. 1: Exterior

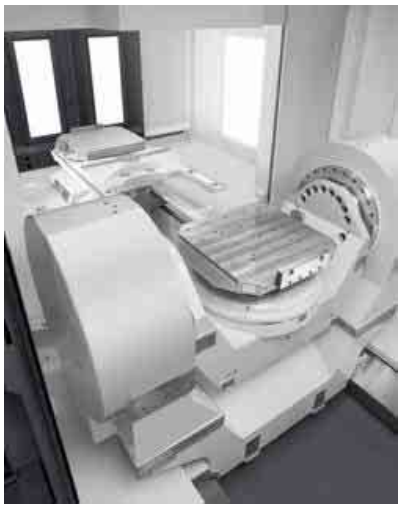

Fig. 2: Interior

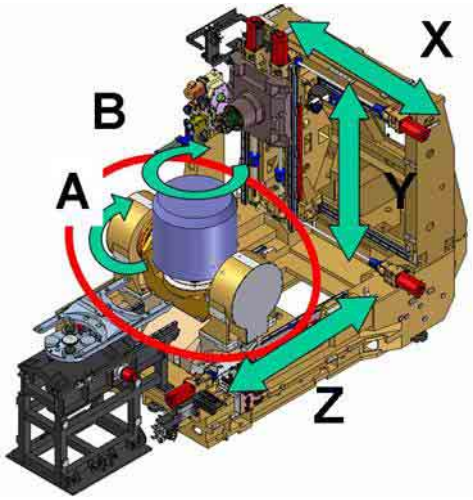

Fig. 3: Axis Structure