MORI SEIKI
THE MACHINE TOOL COMPANY

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Press Release

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Development of a New Thermal Displacement Control Function Which Suppresses Displacement Caused by Changes in Ambient Temperature to Within 5 - 8 µm

Added to the NL2500 CNC Lathe and the NV6000 DCG Vertical Machining Center and Will Be Released at JIMTOF2006

Mori Seiki Co., Ltd. has **successfully completed the development of a new thermal displacement control function**. The function has been installed in an NL Series CNC lathe and we have started practical tests on it.

The new thermal displacement control function offsets the structure's thermal displacement caused by changes in ambient temperature or heat generated by ball screws and motors, minimizing errors. The function measures the temperature using the thermal sensors mounted on the bed and column, **predicts the amount of displacement in real time,** and adjusts the position of the spindle or the turret to compensate.

For machine tools, which require accuracy to within units of 1 µm, changes in ambient temperature are always a major problem. For example, iron has displacement of 12 µm per 1 meter for every 1 ˚C of temperature increase. In order to control this displacement, warming-up operation before machining and additional air conditioners to manage the factory temperature are generally needed, causing inefficiency and unnecessary investment in equipment and plant.

The new thermal displacement control function was developed to solve these problems, by making use of our expert knowledge of the mechanics of thermal displacement and repeated computer simulations and tests. We found the ideal locations for the thermal sensors and used high-speed data calculation to adjust the position of the feed axes. As a result, we succeeded in controlling thermal displacement to within 5 - 8 µm (actual test results) for a 10 ˚C change in the ambient temperature (over a 4-hour period). Without offset, displacement varied depending on the machine, but reached as high as 50 µm.

The high-rigidity, high-precision CNC lathe NL2500 and the vertical machining center NV6000 DCG have adopted this function, and they will be on display at **JIMTOF2006 (23rd Japan International Machine Tool Fair)**, which will be held at Tokyo Big Site from November 1, 2006. After that, it will be made available on the N Series machining centers and 12 models of CNC lathes.

Mori Seiki Co., Ltd. will gradually install this new function, which ensures machine accuracy regardless of the customers' factory conditions and machining programs, as standard. This will eliminate any anxiety which customers may feel about variations in machining accuracy and dimensional errors resulting from environmental changes.

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