

## **VOLUMETRIC POSITIONING ERROR MEASUREMENT AND COMPENSATION FOR A LARGE ASPECT RATIO MACHINE**

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### **Abstract**

The competition in global manufacturing today requires higher accuracy and better quality machine tools. For a large aspect ratio machine, just calibrate and compensate the 3 displacement errors (or pitch errors) are not enough. It is important to measure the volumetric positioning errors including all 3 displacement errors, 6 straightness errors and 3 squareness errors, and to compensate these errors.

Using the laser vector measurement technique, the volumetric positioning errors of an AWEA large aspect ratio machining center model VP-3012, has been measured. The working volume is 118" x 42" x 30". The measured volumetric positioning errors were downloaded to the Fanuc 18M controller to compensate the errors. The volumetric machine positioning accuracy was checked based on the ASME B5.57 standard. The 4 body diagonal displacement errors were measured without volumetric compensation and with volumetric compensation. An improvement on the volumetric accuracy of 300% was observed.

The laser vector measurement technique, the basic theory of operation, the hardware, the setup and alignment, the data collection and processing, and some test results will be described.

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