

Line spacing calibration by using NIMT Line Scale Interferometer System

Abstract

This work aimed to develop the NIMT Line Scale Interferometer System for calibration of line spacing for supporting several industries. The NIMT Line Scale Interferometer System calibrator was the assemble of both checked straightness of stage and the Laser Interferometer System. The straightness of stage sized 400 mm was checked by CERA Straight Master, Model SM-C1000-22, serial number 0500012. The measurement results of straightness in horizontal and vertical were 3 μm and 4 μm , respectively. Then, the finished assemble of the stage and the laser interferometer system was investigated for all systems by comparing the measurement result. The two artifacts for comparing measurement result were Working Standard Scale 300 mm trademark Mitutoyo, serial number 102906 and Reading Scale 300 mm trademark Nikon, serial number 4108. The two reference measurement values were obtained based on the 2 different types of calibrators, the Line Scale Interferometer System and the 3D CNC Vision Measuring Machine, respectively. The results of comparison measurement between the NIMT Line Scale Interferometer System and the Line Scale Interferometer System showed the maximum EN ratio at 0.89 at nominal value 90 mm and minimum EN ratio at 0.62 at nominal 180 mm. While the results of comparison measurement between the NIMT Line Scale Interferometer System and the 3D CNC Vision Measuring Machine showed maximum EN ratio at 0.39 at nominal value 120 mm and minimum EN ratio at 0.10 at nominal 280 mm. Even though the value of En ratio at maximum was relatively high value, the capability of the NIMT Line Scale Interferometer System is well enough to support various industries.

Keywords line spacing; calibrator; artifact; En ratio

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