

Application of Nanoimprint Technology to Diffraction Grating Scale for Microrotary Encoder

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Using nanoimprint technology, we developed a rotary diffraction grating scale, which is used for microrotary encoding. The off-center error between the center of the through-hole for inserting a rotational axis and the center of the high-precision micropattern on the periphery of the scale is less than 3 μm because we are able to shape the through-hole and the grating pattern simultaneously. The rotary grating is of sufficient accuracy to use as the scale in a microrotary encoder. The use of nanoimprinting is groundbreaking, in view of the traditionally poor centering precision of grating scale through-holes fabricated by conventional photolithography coupled with the machining of through-holes.

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