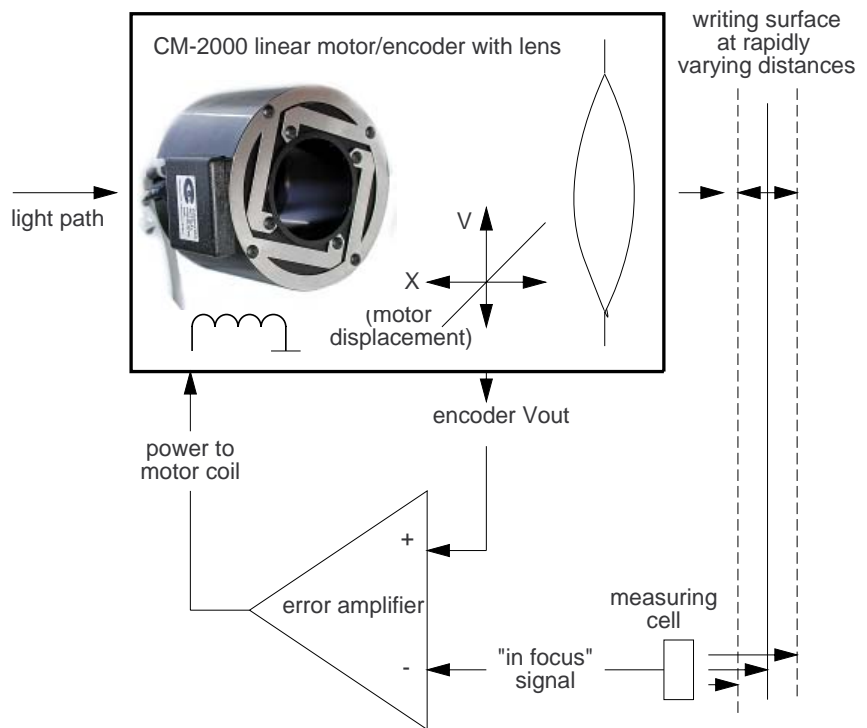




Application note 100: CM-2000 linear motor with integral linear encoder

This note describes the solution provided by Allied Motion for a rapid means of focussing a multiple laser beam used in an imaging application. The problem presented was the varying distance of the media to the focus plane which caused 'fuzzy' images and which also put severe constraints on the allowable runout of the media carrier, increasing the cost and complexity of the substantial mechanical platform.

When invited by the customer to assist in improving the image quality, EMOTEQ/COPI custom designed a linear motor which consists of a lightweight inner barrel and external housing, sized for the desired lens assembly. The lightweight barrel is precisely aligned with the external housing by means of custom flex mounts and allows a coaxial movement of approximately $\pm 0.40''$, more than adequate to focus the multiple laser beams on the writing surface even at large runouts. The barrel's movement is powered by a neodymium magnet assembly, an integral part of the barrel, and a coil mounted on the inner surface of the external housing. This arrangement yields an excellent force to inertia ratio as well as superior heat sinking capacity of the coil due to the low thermal resistance from coil to housing.



The integral feedback device is an optical linear encoder which provides an output voltage proportional to the displacement of the inner barrel with respect to the (stationary) housing. There is no 'signal processing' time involved (such as associated with magnetic transducers) and therefore the bandwidth is a fast 150 Hz, even when adding the fairly substantial lens assembly. This allows for a very high sample rate and subsequent correction of the focal point, which in turn allows a large and rapidly changing runout of the media carrier without impairing the imaging quality.

The CM-2000 has found further applications such as use in anti-vibration platforms etc. For information and assistance, please contact:

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