

Application note 111: custom low-profile invar based motor/encoder

This note describes the motor/encoder provided by Allied Motion for use in a portable tuneable laser

This assembly presented very specific thermal, mechanical and accuracy requirements dictated by the application, a portable tuneable laser monochromatic light source to be used laboratory conditions as well as in the field:

- space was at a premium in the portable instrument and the body of the motor was not to exceed 1" in height
- the thermal stability of the wavelength generated by the optics had to be very high over a large temperature range. The motor/encoder positions the wavelength controlling optical element and therefore is crucial in maintaining this stability.
- due to the extreme, picometer wavelength resolution desired, the encoder resolution had to be in excess of 36 million measuring steps

The EMOTEQ size 17 motor was chosen for its small size and high torque-to-inertia characteristics.

The encoder used is a COPI CP-800 series derivative with a linecount of 4096 full A and B ultra low distortion sinusoids, allowing at least 12 bits of interpolation.

Since the base of the assembly was going to be used as mounting platform of the optical frequency-generating path, invar (despite its poor machineability) was chosen. This prevents the optical components as well as the encoder shaft from shifting position with respect to one another, which would lead to frequency shifts over temperature.

For information and assistance, please contact:

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