



## *Application note 106: large bore hollow shaft motor/high resolution encoder for harsh environments*

*This note describes a custom motor/encoder designed for direct-drive use in a compact high precision laser welding and cutting center, replacing a geared motor assembly. The center is used to make microscopic cuts in a very small endoscopic device.*

The challenge presented was to design a direct-drive hollow shaft motor/encoder assembly used in a hostile environment, such as aggressive gases, dirt, dust, grime and diamond grit. The hollow shaft is used to accommodate a pneumatic collet as well as the related air conduits and sensing/control connections. The direct drive requirement dictated a high resolution encoder with a minimum of 2,500,000 measuring steps and a very high torque brushless DC motor.

The challenge was more than met with the EMOTEQ Megaflux series 0100 high torque motor packaged with an integral COPI infinite resolution sine/cosine encoder in a rugged, stainless steel housing with an OD of 4.85" with a bore of 1.5". Heavy duty sealed bearings were used in view of the aggressive environment.



For a next model welding center for the same customer and identical environment, the use of a CM-5000 motor/encoder is contemplated. This motor has a larger bore of 2" with an outside diameter of 5". The encoder assembly has been extended with a user selectable resolution of between 50,000 and 2,250,000 full quadrature counts (200,000 and 9,000,000 measuring steps).

For information and assistance, please contact:

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