

A Revolution in Encoder Design and Integration

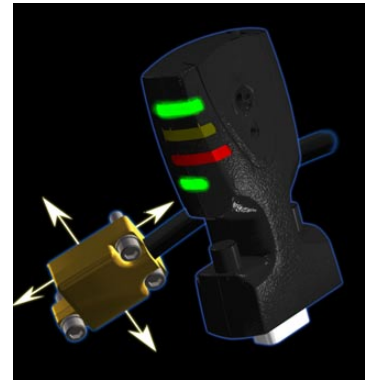
MicroE Systems applies multiple technologies to make encoders smaller, faster and smarter than ever before. The unique, multi-patented optical design is scalable, with the addition of optical elements, to create encoders that achieve the best performance for the widest range of applications. Using microphotonic technology reduces the critical Z height of the sensor to an unprecedented 5.6mm or ¼ inch (M1200 and M1700 models) and results in broad sensor alignment tolerances for incredibly easy installation.

PurePrecision™ Optics

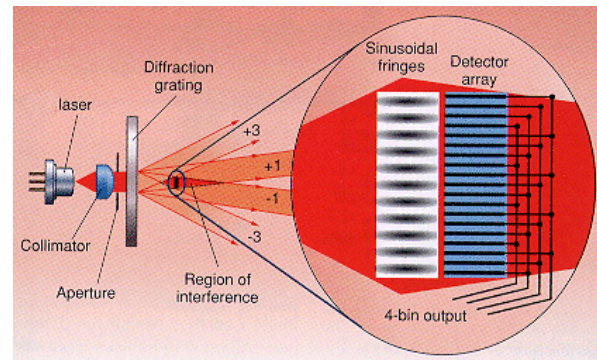
MicroE Systems' technology is based on physical optics that detect the interference between diffraction orders to produce nearly perfect sinusoidal signals from a photodetector array inserted in the fringe pattern. The sinusoidal signals are electronically interpolated to allow detection of displacement that is only a fraction of the optical fringe period.

Using a laser light source, the laser beam is first collimated by a lens then sized by an aperture. The collimated, sized beam passes through a grating that diffracts the light into discrete orders, with the 0th and all even orders suppressed by the grating construction. With the 0 order suppressed, a region exists beyond the diverging 3rd order where only the ± 1 st orders overlap to create a nearly pure sinusoidal interference. A photodetector array is placed within this region, and produces four channels of nearly pure sinusoidal output when there is relative motion between the grating and the detector. Electronics amplify, normalize, and interpolate the output to the desired level of resolution. A transmissive design is shown for clarity, but reflective designs operate in the same manner and are used where applicable.

The simplicity of this design yields several advantages over both the Michelson interferometer and competitive optical encoders. Measurements may be made with only a laser source and its collimating optics, a diffractive grating, and a detector array. This results in an extremely compact encoder system which can be integrated into many applications unfit for conventional encoders. In addition, a direct relationship between the grating and the fringe movement desensitizes the encoder from environmentally induced errors to which Michelson interferometers are susceptible. Furthermore, because the region of interference is large, and because nearly sinusoidal interference is obtained everywhere within this region, alignment tolerances are far more relaxed than competing technologies. All in all, this PurePrecision optics yields a compact, highly accurate encoder that can be easily integrated into many applications.



Pure Precision™ optics enables fast alignment and easy encoder set up.



With PurePrecision optics the detector sits within a wide area of nearly pure sinusoidal interference, allowing a pure sinusoidal output signal as well as a very compact sensor design.



Mercury Series encoders have the smallest high performance sensors in the industry. Less than half the height of competitive encoders.