Quantum Devices, Inc.

"Improving the Quality of Life through the Power in Light"

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SHADOW TECHNOLOGY

Shadow technology Sensor designs provide several distinct advantages over traditional differential sensing encoder systems. The ability of this technology to discriminate typical optical system errors as common mode noise increases performance and reliability while simplifying manufacturing requirements for optical encoders.

. . .WHAT IS COMMON MODE NOISE REJECTION?

When considering a differential sensing system, like the example typically found in most optical encoders, the sensor analog signals forming one encoder output channel are mirror images of each other, which oscillate from a maximum peak to a minimum peak. This analog oscillation corresponds to the rotation of an encoder code wheel, which shutters light to a stationary sensing device. At the point where differential signals are the same value and change polarity relative to each other is when a transition occurs in the differential squaring electronics. Hence, the purpose of the differential system is providing transitions only when analog signals change polarity relative to each other.

Common mode noise results in disturbances to analog signals that are essentially the same in amplitude and duration, this, has the potential to cause encoder output signal variations. The intention of a differential system is to reject common mode noise and process only the differential signals. The ability of a differential system to reject this noise component is called Common Mode Rejection Ratio or CMRR and is measured in db.

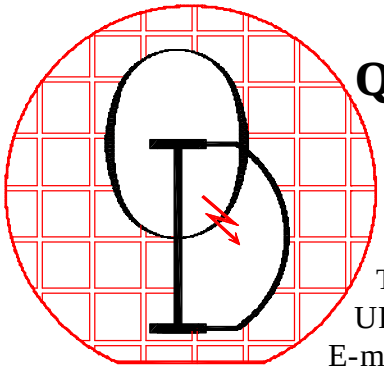
The design goal of encoder optics is to make as many optical and mechanical system errors as possible look like common mode noise. This is where Shadow technology excels over present sensing systems. Typical optical system errors such as disc light transfer characteristics, code wheel total indicated run out, sensor alignment to code wheel, sensor to code wheel air gap/position variations, are all rejected as common mode noise.

Another benefit of shadow technology is the ability to increase this disc/sensor air gap. The ability to convert optical system errors to common mode noise results in an air gap increase. With the increase in air gap, the mechanical stability of the encoder over time is significantly improved and this results in improved field service life. Bearing wear in the field is also represented as a common mode noise component and rejected.

. . . What does Shadow Technology Mean to Encoder Manufacturers?

Shadow Technology sensors offer simplified encoder assembly due to the improvement in sensor/code wheel alignment tolerance. Simplified assembly results in reduced manufacturing costs. The code wheel light transfer constancy and mechanical system inconstancies become less of an issue and result in lower material costs. High tolerance to mechanical system change and contamination results in less field failures and satisfied customers. The bottom line is improved as the encoder manufacturers enjoys a higher profit margin and improved competitive edge.

For more information contact…



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