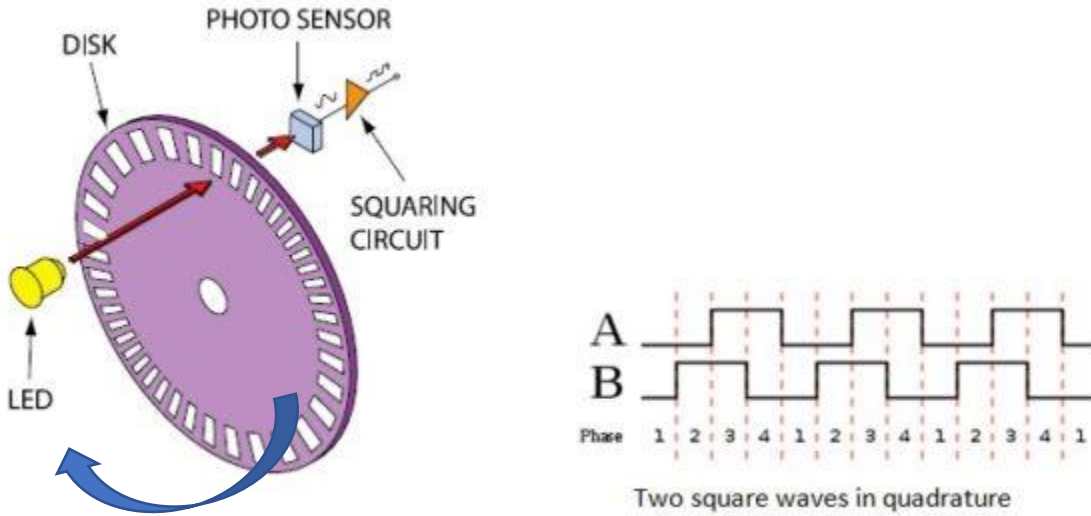


MMP Encoder Comparison

This document provides a brief overview of different encoder features of those sold by Midwest Motion Products, Inc.

Optical vs Magnetic Encoders

Optical encoders utilize an LED light source which passes through a transparent disk with photodetectors to induce a pulse signal as the disk rotates.



Credit : CUI Devices

Optical encoders are a simple, go-to, cost-effective solution for a motor speed readout. There are however certain considerations that have been accounted for with regards to application.

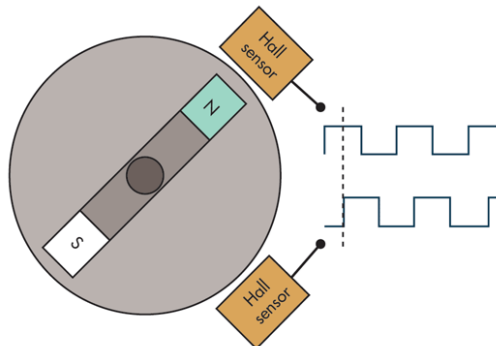
Advantages:

- Low cost.
- High accuracy readings.
- Lifetime of service limited by illuminating element.

Disadvantages

- Due to line of sight requirement, unit is potentially susceptible to ingress of dust, dirt, or oil.
- Optical disk can be sensitive to vibrations and shock that could affect disk placement.
- Temperature extremes can potentially warp the disk, negatively affecting operation.

If optical encoders are not suitable for your application, magnetic encoders could be a viable alternative. Magnetic encoders utilize a spinning magnetic disk with alternating poles and a magnetically sensitive sensor to induce a pulse signal.



Credit : HS Magnets



Magnetic encoders can be an excellent alternative in certain application demands and environments. Considerations include:

Advantages

- Utilization of magnetic fields rather than an optical medium makes the encoder unaffected by ingress of dust, dirt, oil, and moisture.
- Rugged construction handles vibration and shock loads better.

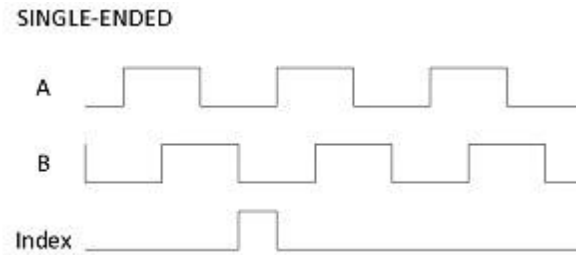
Disadvantages

- Susceptible to magnetic interference from sources such as a motor.
- Magnetic fields are easily affected by temperature extremes and thus have a limited temperature window.
- Typically a lower accuracy and resolution available compared to optical counterparts.

Single-ended vs Differential Signals:

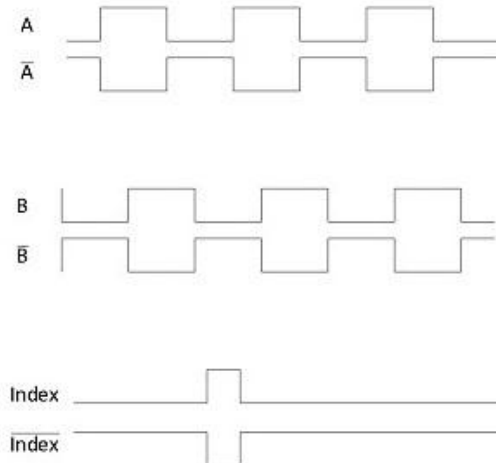
Encoders are utilized to provide a pulsed output signal to correlate with a motor output speed. Different kinds of output signals exist and one important distinction to make is between single-ended and differential signals.

Singled-ended signals have pulses in their channels measured between a pulse and the ground wire.



These types of signals are advantageous when simpler, lower cost wiring is needed for an encoder setup. However, since these signals are so low in value and measured with respect to ground this makes them susceptible to electrical noise.

Differential signals may be an answer to these problems since they have pulses of the same channel in opposite polarities.



Since the signals are measured as a difference with respect to each other rather than to ground, this makes filtering out noise much easier as both wires will see the same amount of noise voltage in their respective signal. That being said, the extra wiring can increase complexity and costs in the application.

Regardless of the application, encoders of many types are available to suit your needs.

If you have any questions feel free to email us at sales@midwestmotion.com