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Speed Measurement

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- DC and AC Tachometers
 - DC V_{out} vs speed

Emf generated is proportional to the speed

<https://www.test-and-measurement-world.com/Terminology/DC-tachometer-generator-vs-AC-tachometer-generator.html>

2

3

- DC and AC Tachometers
 - AC Freq vs speed

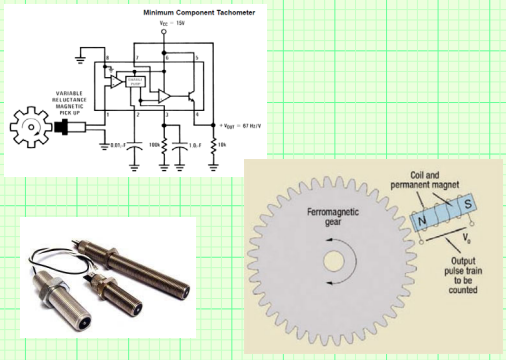
Amplitude and frequency of emf is proportional to speed of rotation

<https://www.test-and-measurement-world.com/Terminology/DC-tachometer-generator-vs-AC-tachometer-generator.html>

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• Magnetic Pickup

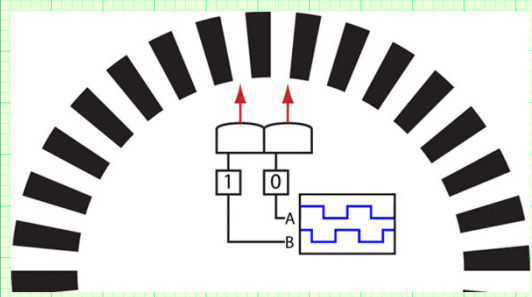


The image contains two diagrams. The top diagram is a circuit schematic for a 'Minimum Component Tachometer'. It shows a gear connected to a coil. The circuit includes a 9V battery, a 10k resistor, a 100k resistor, a 100pF capacitor, and a 10k resistor. The output is labeled 'V_{out} = 87.5mV'. The bottom diagram shows a 'Ferromagnetic gear' with a 'Coil and permanent magnet' assembly. The magnet has North (N) and South (S) poles. The output pulse train is labeled 'Output pulse train to be counted'.

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• Pulse Encoder



The diagram shows a semi-circular disk with alternating black and white segments. Two sensors are positioned above the disk, with red arrows indicating they are reading the segments. The sensors are connected to a circuit with two outputs, A and B. A timing diagram shows the output waveforms for A and B, which are square waves that are phase-shifted relative to each other.

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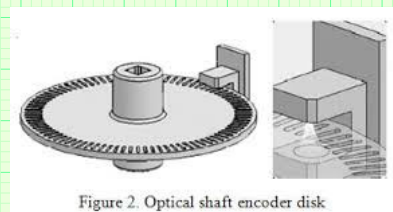


Figure 2. Optical shaft encoder disk

The image shows a circular optical shaft encoder disk with a central shaft. A sensor is positioned to read the disk's surface. The disk has a series of radial lines or segments.

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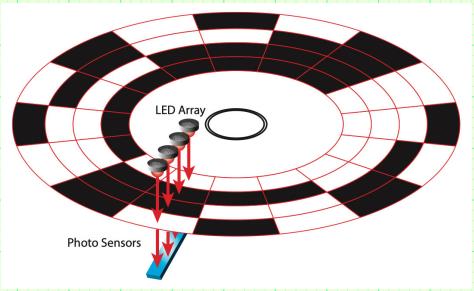
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Position Measurement

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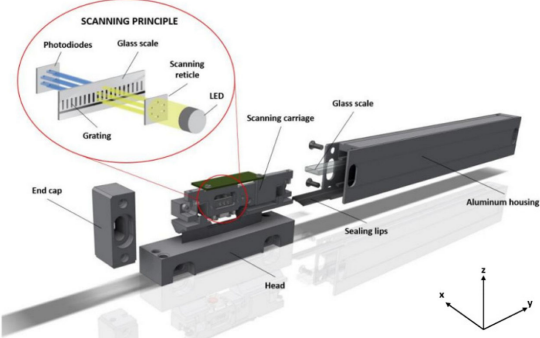


LED Array
Photo Sensors

<https://www.linearmotiontips.com/when-is-encoder-resolution-specified-in-bits-and-what-does-that-tell-us/>

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SCANNING PRINCIPLE

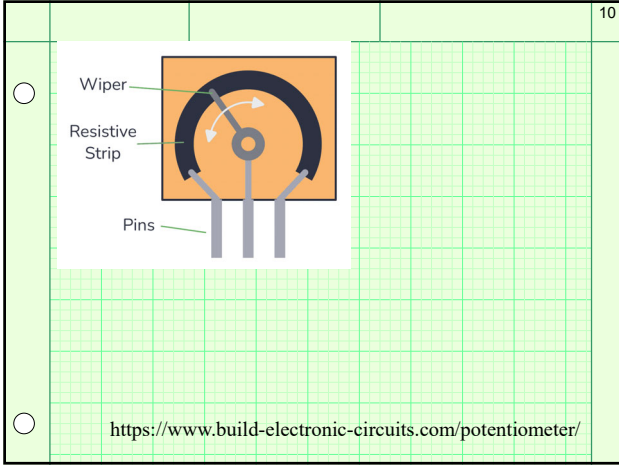
Photodiodes Glass scale Scanning reticle LED

Grating Scanning carriage Glass scale

End cap Head Sealing lips Aluminum housing

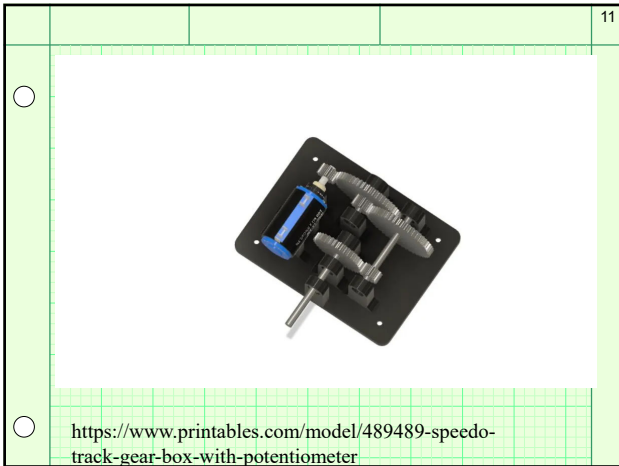
<https://www.mdpi.com/1424-8220/22/8/2977>

9



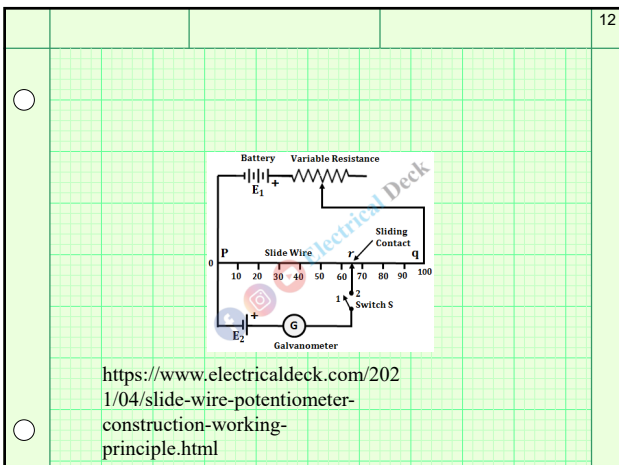
<https://www.build-electronic-circuits.com/potentiometer/>

10



<https://www.printables.com/model/489489-speedo-track-gear-box-with-potentiometer>

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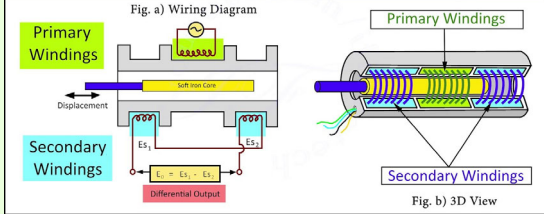


<https://www.electricaldeck.com/2021/04/slide-wire-potentiometer-construction-working-principle.html>

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LVDT

Linear Variable Differential Transducer



<https://www.youtube.com/watch?v=zkiXsS7p7w>
