DEVELOPMENT AND FABRICATING OF MECHANICAL LINEAR SENSOR BASE ON LED AND PHOTODIODE MECHANISM

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"I declared that this thesis is the result of my own work except the ideas and summaries which I clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree"

Signed : .....

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ABSTRACT

A Hydraulic cylinder is a mechanical actuator that is used to give a linear force through a linear stroke. It has many industrial and heavy duty construction applications. Making it an import element due to it is high power to weight ratio. Measuring the linear displacement of hydraulic cylinders is crucial factor for the accuracy concerns in many applications. However, the current linear measurement instruments are expensive with the several limitations; limited distances measuring range, lack of accuracy, heavy weight, required for calibration process and complexity of their system. Therefore, this project is to develop, design and fabricate a linear measurement sensor based on LED (light emitting diode) and photodiode. The mechanical linear sensor device will be design with several major components, such as a roller ball, linear wheel, flexible rod, LED (light emitting diode) and photodiode and the casing of sensor. The ball is held in place by a support wheel and one shaft. As it rolls, the shaft turns with linear motion. At one end of the shafts, a spoked wheel also turns. As these spokes rotate, infrared light signals from a light-emitting diode (LED) flicker through the spokes and are intercepted by a light detector. The dark and light are translated by phototransistors into electrical pulses that go to the oscilloscope to make a data. Finally, the proposed mechanical linear measurement sensor successfully fabricated and operated. Basically it consists of five components; roller ball, linear wheel, flexible rod, LED (light emitting diode) and photodiode and casing of the sensor. It had been design to achieve five meters measuring distance. This project has many applications for what industries required and it comprised a simple components with more advantages such as low cost, reliable, light weight, portable, easy to use and adopt measuring distances.

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