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Experimental Analysis of Contact and Contactless Tachometer

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***Abstract*: Electrical and mechanical machineries are used in industrial and domestic application Measurement of speed of revolving machineries is necessary for their proper functioning and controlling Tachometer is an instrument which is used to measure the speed of revolving shaft, gear and pulley. This Project describes the study analysis of tachometer and its performance**

***Keywords*: Contactless Tachometer**

1. Introduction

A tachometer is a fairly common instrument designed to measure the rotation speed of an object or substance. The term comes from Greek tachos, meaning speed, and metron, meaning to measure. The tachometer is laid out traditionally as a calibrated analog dial, with a pointer indicating the current reading and markings indicating safe and dangerous ranges of speeds. A tachometer measures the speed in revolutions per minute (RPM) at which a mechanical device is rotating. The traditional tachometer requires physical contact with the device being measured. In certain situations, this is not feasible for technical or safety reasons. So to improve the safety of operation, here an optical tachometer is used which is also cost effective. The proposed optical tachometer can be used to measure speed from a distance. The tachometer works by pulsing tight beam of light against a reflective spot of the rotating element. It measures the rate at which the light beam is reflected, and displays the speed in RPM in a 4-digit display.

Types of Tachometer:

1. Contact Type Tachometer
2. Contactless Type Tachometer

2. Literature review

The research papers related to the present work on tachometer are discussed and what conclusions were incurred are highlighted in this section.

A. S. M. Bakibillah Muhammad Athar Uddin Shah Ahsanul Haque, Presented work for overview of the setup of the proposed tachometer is given in Section 2. The Infrared light source circuit and IR receiver module are described in Section 3. The operation of monostable multivibrator of 555 timer is discussed in Section 4. Digital counter and display circuit are discussed in Section 5. Section 6 covers the experimental results and performance analysis and section 7 points out the conclusion inferred from this work The proposed tachometer finds its applicability in many fields, such as fast response over speed shut down, petrochemical production applications, pump or generator applications, low speed switching.

Eduardo Ramon Galvan, Presented work for Digital tachometers for speed and position measurement. This describes a digital tachometer for angular position and speed measurement. The tachometer has been implemented using two simple FPGAs, defining an external hardware that discharges the processor's task. A common method for angular position and speed estimation, in adjustable speed drives, uses an incremental shaft encoder and an electronic circuit. This article presents a high precision electronic conditioning of a biphase incremental encoder generated signal. A digital tachometer, for angular position and speed measurement, is implemented using two simple FPGAs. One FPGA, based on the multi range CET method, is applied to measure the angular speed with a relative error lower than 500ppm. A second FPGA implements a high precision pseudo-absolute angular position sensor. Experimental results are provided to show the behaviour of the measurement system. To evaluate the abilities of the measurement system, a PC-AT board has been designed and a 2000 pulses per revolution commercial biphase incremental encoder has been used. Electrical drives play an important role electromechanical energy converters in transportation and most production processes. In monitoring and control systems of rotary machines it is essential that rotor position and speed measurements are available. Also, knowledge of these parameters is indispensable in parameter estimation algorithms, sensorless control systems, electric or thermal modelling and in vector control techniques. In all cases a high precision measurement system is required.

ButteMrorth, Presented work for Analogue Tachometer for Measuring Heart Rates in Small Mammals. An analogue circuit incorporates a change pump frequency-to-voltage converter integrated circuit and a high-pass filter to remove signal drift and animal movement artifacts. During cardiopulmonary assessments on awake rodents restrained in head-out plethysmographs', we obtain electrocardiograms (ECGs) from platinum pin electrodes (Grass Instrument, Quincy, MA); they are soldered to surgical staples and attached to the dorsal

surface of all four limb?. The electrodes are connected to a bioelectric amplifier (Hewlett-Packard, Palo Alto, CA, Model 8811A) and the resulting signals are displayed on a polygraph recorder. As an alternative to manual counting of RR intervals we have designed a simple inexpensive cardiac tachometer to display heart rate and to provide a signal which could be interfaced to a microcomputer for data collection and storage. This device is required to detect the fast heart rate.

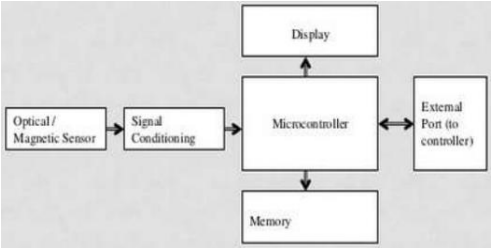

Fig. 1. Block diagram

3. Conclusion

The aim of this Paper is to find speed of the rotating devices using tachometer and then make some observations from it. And to note down what is difference in readings for contact and contactless tachometer.

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