

Simulation of Transformer Data Logger Sensor using Multisim

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ABSTRACT

The power system is a sub field of engineering that deals with the generation, transmission and distributions of electrical power as well as the electrical devices connected to such systems including generators, motors and transformers[1]. Transformers is one of the electrical equipments where it is used to step up and step down voltage. Since it is one of the important electrical equipment, it must always be in good condition. Maintenance and services always been done by technicians and engineers to ensure transformer work well. Developments in data storage for energy measurement applications offer scope for a few approaches to the collection of data from electricity distribution networks[5]. In this globalization era, the development and changes in the regulation and management of the electricity become wide and need good performance in collecting data especially for electrical supply. Data logger is one of the devices which is use to read and record transformer parameters. Data logger is also called a standalone device that records data over time with built in sensor [2]. The data logger is now in everyday use for measurement and data recording of critical parameters. By using data logger, workers can be reduced and can save time in taking data.

A data logger with appropriate sensors can also be used to measures power, humidity, temperatures and system voltages. This project will identify the value taken from data logger sensors. The development of this sensor is to sense current and voltage. Sensor is very important in order to detect variable current and voltage which comes from transformer. Sensor itself cannot be connected directly, so data logger is used to read data or in other words to collect transformer parameters directly. Data logger will discuss various parameters in which a utility has an interest, the potential for measuring them with sufficient accuracy according to the application, the combination of several measurements in one device. All parameters are very important in order to ensure transformer is in good condition. Both voltage and current data logger sensor can only detect DC voltage. As for DC voltage it need converter because transformer produce AC voltage. This data logger only can be connected at the output of transformer.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Data logger is an electronic device that records data over time. In the past, readings such as temperature, humidity, power, voltage, current etc had been taken manually where people need to wait for certain time and these readings must be taken regularly in order to get a true data. Nowadays, data logger is a wide application, it is used to record data from electrical devices. This project is to simulate the integration of data logger and satisfaction to obtain a system for continuous monitoring of power transformer.

Sensor is a device that can measure a physical quantity and convert it into a signal which can be read by an observer or by an instrument[4]. In this project there are two main sensors which are current sensor and voltage sensor. These sensors are very sensitive where it will receive input signal and convert it into electrical form or output signal[4]. A similarity for both sensors is it used operational amplifier. There is a bit different for current sensor where it used junction gate field transistor (JFET). The transistor design is to restrict or control the current in the channel by expanding or contracting the depletion region, hence the channel cross-section, with a gate signal.

In this project there are three main circuits basically the circuit for current sensor and voltage sensor. By using an external circuit as a converter this circuit can detect AC analysis. The external circuit is AC to DC converter. Since value of voltage transformer is AC so this converter circuit is needed in order to convert it into DC voltage. By doing this, both sensor circuit can be used.