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The Real Time Location and Fault Alert System for Distribution Transformer

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***Abstract*: Distribution transformers are one of the most important equipment in power network. Because of, the large number of transformers distributed over a wide area in power electric systems, the data acquisition and condition monitoring is a important issue. The main aim of this system is distribution transformer monitoring and controlling through GSM modem. Here transformers are damaged due to the oil damage. Oil damage is depends on different parameters and environmental conditions. Now in this system we are concentrating on temperature of transformer and viscosity of oil .In this system temperature and viscosity monitoring and control action is performed based on the AVR microcontroller. After interfacing the required components user has to develop one application program in embedded-c. Here controller is continuously reading the temperature and viscosity, and display on the LCD along with the set point. Set point is saved in the external memory. If current value is crossing the set point then device will off and buzzer is ON along with the fan (DC motor). And one alert message is sent to the predefined number which is mentioned in application program. If user wants to change the set point he has to send one predefined message format to the one particular phone number which is placed in the GSM module. Then controller is reading that message and if it is in the valid format then it is updated to the external memory. Now control action is based on the new set point. Here set point is saved in the external memory so even power is gone set point will not change sensor.**

***Keywords*: LM35, viscosity module, AVR atmega-8, LCD, DC motor, sensor.**

1. Introduction

In power system the transformer is electrical equipment which distribute and transform the low voltage use us directly. The effective approach to prevent malfunctions of power equipment is the online monitoring. The main concern of transformer protection is protection of transformer against internal faults. The transformer failure occurs due to temperature rise, overload, low oil level, poor quality of cable and improper installation and maintains. Out of these factors temperature rise low oil level and overload need continuous monitoring to save or increased transformer life. Data are collected continuously and compared with set value and then information about the system health.

2. Objectives

The objective of our project is Helps to monitor the power grid, industry. No need to put a person on relay to monitor the fault /Relay

A. Related work

M.Anand, R.Sumi, G.Nithya (2014): In this paper authors tells objective of this to monitor the transformer parameters such as voltage, current, frequency and temperature and to control using microcontroller with the help of zigbee transceiver. It explains how to monitor the above parameters and isolate the power supply during emergencies. Zigbee is wireless transceiver where we can send and receive the data through this module. The monitored parameters will be sent to the PC through zigbee. The cooling system of the transformer is performed if winding temperature exceeds a certain value [1]. Rakesh Kumar Pandey, Dilip Kumar (2013): In this paper authors explains the distributed transformer networks remote monitoring system (DTRMS) is developed and constructed, for monitor and record the parameters like temperature, oil level status, of a distribution transformer. The system consists of a microcontroller based circuit, with solid-state components for handling sensors, power back-up, real time clock and data communication module which based on Zigbee protocol. Sensors, including a Resistance Temperature Detector (RTD) and a Liquid level sensor performs according to manufacturers' specifications are calibrated and tested using Lab VIEW software [2]. Automated Fault Location and Isolation in Distribution Grids with Distributed Control and Unreliable Communication Neelabh Kashyap, Chen-Wei Yang, Chen-Wei Yang. This paper presents the analysis and simulation of the performance of fault location and isolation (FLI) in an automated power distribution feeder. This system is composed of two coupled networks: a power system consisting of a distribution feeder with multiple load buses, and an unreliable communication network of the distributed intelligent agents in the system, namely, the substation automation and fault protection units separating segments of the feeder. We provide a complete specification of a distributed algorithm for FLI and an exact characterization of the time from the occurrence of a fault to its location and isolation. Both apply to a distribution feeder with an arbitrary number of buses. These models are then

refined into a hybrid simulation that combines three models executing in parallel: a power system model based on dc power flow, a distributed automation system model for the intelligent agents constructed using the IEC 61499distributed automation standard, and an abstract communication network model that unreliably links the physically distributed agents. The results demonstrate the effect of communication network reliability at two levels of design abstraction, the correspondence of results at the two levels, and the use of a modern co-simulation framework to verify the performance of distributed smart grid automation algorithms. Transformers Fault Detection Using Wavelet Transform Y. Najafi Sarem, E. Hashemzadeh, M.A. Layegh. In order to an analyze a signal, wavelet transform can be applied as well as Fourier transform. Fourier transform and its inverse can transform a signal between the time and frequency domains. Therefore, it is possible to view the signal characteristics either in time or frequency domain, but not the combination of both domains. Differently from the case of Fourier transform, the Wavelet Analysis (WT) provides a varying time frequency resolution in the time frequency plane. In this paper, a new method for protecting power transformers based on the energy of differential- current signals is introduced. The simulation results show that it is possible to detect different kinds of internal faults using this method. Furthermore, it is possible to distinguish such faults from magnetizing inrush current.

B. Block diagram

Fig. shows the circuit diagram of this system. The microcontroller having 4 port port0, port1, port2, port3, having 8 pins which are analog to digital converter. First 4 pin of Port 0 connected to data pin of LCD remaining 4 pin are connected to R/W, EN, RS etc. of LCD. For displaying status of system for various types of fault. The DB9 is connected in between them also from port 1. Port 2 is also 8 pin configuration which is having analog signal which are connected to ULN2803 IC input pin. Port 3 having 8 pin out of these the RXD and TXD pin are connected to R1 out and T1 in pin of MAX232 and then T1 out and R1 in are connected to receive and transmit data pin of RS232.

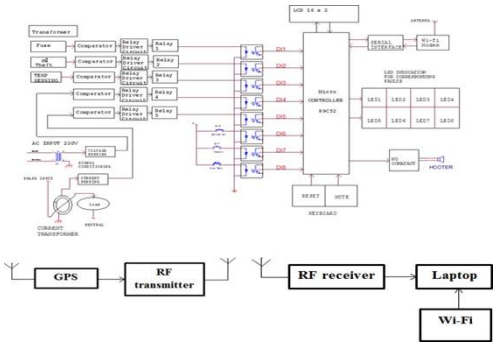

Fig. 1. Block diagram

Advantages

- It is reliable system.
- It is effective than manual monitoring.
- It is recover the system less time.
- It increased life of equipment.
- No manual errors.
- Remote location operation can be done.

Disadvantages

- Costly for general application.
- This system is not battery operated.
- The system is network dependent.

3. Conclusion

By using microcontroller & latest technology like GSM communication, this system is very intelligent for protection fault and sends alert messages to user for Power generator serve as a reliable an efficient system. In this system we can monitor and detect fault with specific adjustable variable pot. So we can change setting as per our requirement. The system provide effective monitoring and protection of power generator by its oil level, oil quality, temperature and operating voltage without involving human intervention.

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