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Microcontroller Based Automatic Control of Generating Transformer 250 MVA Cooling System

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ABSTRACT

The NLC India limited is a successful organization which has served its purpose of electrical generation for more than 50 years. The generation is done for its maximum possible capacity to produce power. There are many factors which affect the efficiency of transformers. Due to the heating up of the winding , the transformer loss its efficiency. To reduce this heating effect of transformer, cooling systems are implemented by means of contactor logic. The contactors are made up of metal, so there is a possibility of arcing which can further increase the temperature.The proposed system overcomes this drawback by implying the same control by using a PIC microcontroller. The controller used here is PIC and the cooling system primarily requires the sensing of the oil temperature and winding temperature. The system gives an alert when the oil level goes below the original level. If the temperature of the winding increases uncontrollably, provision to trip the transformer is also implemented.

Index Terms*— *Generating transformer, PIC microcontroller, cooling fans, oil pumps, oil level, reserve fans, reserve pumps.

I. INTRODUCTION

A Transformer is a static device used for the purpose of transmitting electrical power by using the principle of electromagnetic induction. The transformer is consisting of two or more windings which by, transforms alternating voltage and current into another system of voltage and current usually of different values and at the same frequency. The principle of a Transformer can be explained by means of Faraday's Law of Electromagnetic induction which states that "Electromotive force is induced in a closed electric circuit whenever there is change in magnetic flux linkage of that circuit and the induced emf is proportional to the rate of change of flux linkage." Transformers are having full load efficiency between 95% to 98.5% which is most highly efficient electrical device. As a transformer being highly efficient, output and input are having nearly same value, and hence it is impractical to measure the efficiency of transformer by using the ratio of output to input. There are losses also available which reduces the efficiency and one of the main losses are due to the heating of transformer. So by using the cooling system we can improve the efficiency of the transformer. A

contactor is an electrically controlled switch used for switching an electrical power circuit. A contactor is controlled by a circuit having lower power level when compared to the switched circuit, such as a 24 V coil. A electromagnet coil controlling a 230 V motor switch. Due to the occurrence of electric current arcing, causes the significant degradation of the contacts, which suffers significant damage. When the contacts gets transition from a closed to an open or from an open to a closed, an electrical arc occurs between them. The break arc is typically more energetic and thus more destructive. In order to improvise the cooling, the proposed system can be implemented.

II. HEADINGS:

1. Introduction.
2. Literature Review.
3. PIC Microcontroller 16F877A.
4. Controller Based Cooling System.
5. Advancement In The System.
6. Conclusion.
7. Future Scope.
8. Acknowledgement.
9. References.

III. FIGURES AND TABLE:

Fig 1 PIC 16F877A

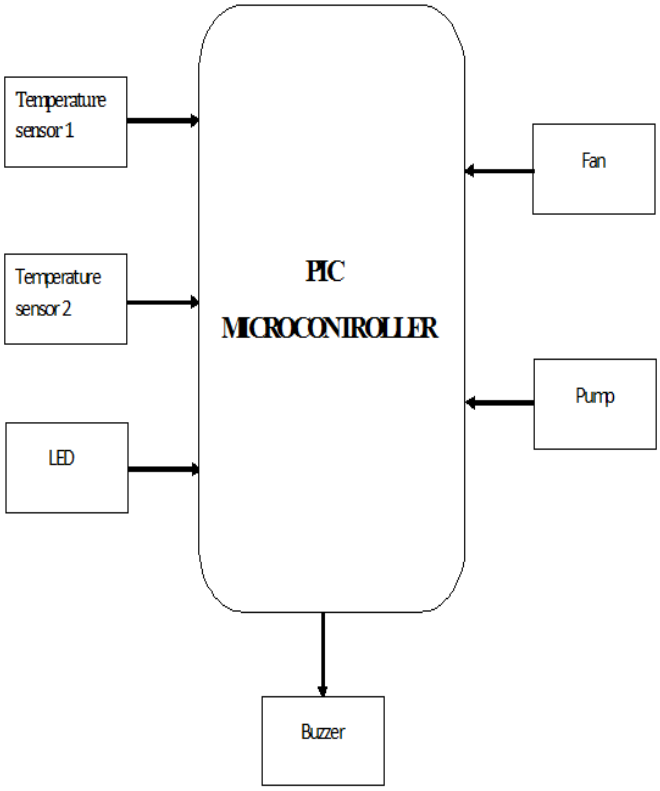

Fig 2 Block Diagram

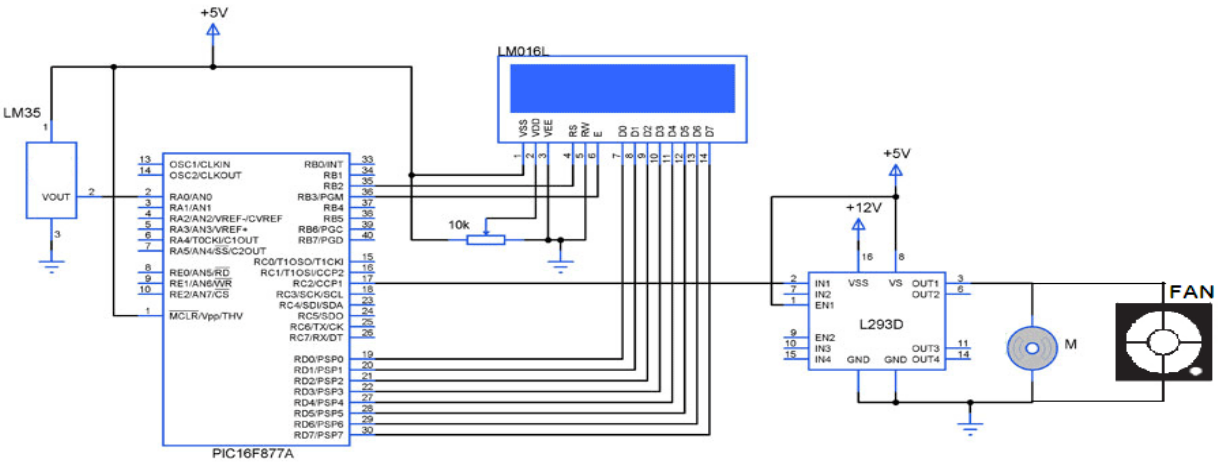

Fig 3 Circuit Diagram

IV. CONCLUSION:

In our project, we use a PIC microcontroller that is used for logic implementation, which reduces the number of external components and wiring. This implementation become cost- effective and gives an ideal solution. In

our project, we use a microcontroller that is PIC for logic implementation, which reduces the number of external components and wiring. So it becomes easier to trace the circuit during fault conditions.

V. ACKNOWLEDGEMENTS:

The cooling methods can be improvised in future trends which will result in a profitable increase in generation of power. More advanced microcontrollers can be used to enhance the controlling features of the system. The operating time can be improvised in future trends.

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