A Review Paper on Diffrential Protection of Transformer Using Arduino

Prince Vishwakarma[1], Kushal Koleker[2], Pratik Sawant[3], AnojkumarYadav[4]
[1, 2, 3, 4] Dept of Electrical Engineering
[1, 2, 3, 4] VIVA Institute Of Technology, Virar

Abstract- Transformers are the essential equipment in the power system. Therefore, the continuity of its operation could be very necessary. Differential safety approach may be hired to protect the Transformers. We have used differential relay mechanism with Arduino Nano &NodeMCU for IoT based Android App monitoring as well as local monitoring through I2C LCD. The NodeMCU is synchronized with Arduino microcontroller. Arduino Microcontroller is very high speed and cost-effective device with good accuracy. By programming in the Arduino, the protection of transformers may be done.

Keywords- NodeMCU, Transformer, Buzzer, LCD, Arduino, Relay

I. INTRODUCTION

The transformer is one of the most essential links in a electric system. And it is a static device which transforms electrical energy from one circuit to another circuit. To protect the transformer from atmospheric dust and dirt, it is totally enclosed and oil immersed. As transformer has no rotating part, the chances of a fault occurring in them are very rare. However, a rare fault may be more dangerous unless the transformer is   disconnected from the system. This necessitates adequate automatic protection for transformers against possible faults. Small capacity transformers are provided with series fuses for protection against overloading and earth faults. No circuit breakers are provided. i.e no automatic protection is given. However, the probability of faults on power transformers is more and hence automatic protection is necessary. A fault that happen beyond the protection zone of the transformer, however fed through the transformer is known as "Through faults". A unit protection of transformer shouldn't operate for through faults. The overload relaying could also be provided to operate with a time lag to provide back-up protection. Internal faults are those in the protected zone of the transformer. These faults can be between phase to phase and phase to ground. Generally, they occur causes of a failure of insulation due to temperature rise. Incipient faults are initial minor causing slow damage. These faults grow into serious faults.

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II. PROBLEM STATEMENT

There is over current protection and protection against over fluxing. The magnetic flux will increases while the voltage will increase. This results increased iron loss and magnetizing current which leads insulation damage and over voltage protection. Lightning overvoltage surges originate from atmospheric discharges and they can reach their peak within a microsecond and subsequently decay very rapidly. Percentage differential current protection for the protection of transformers against internal short circuits and it offers the best overall protection for internal faults
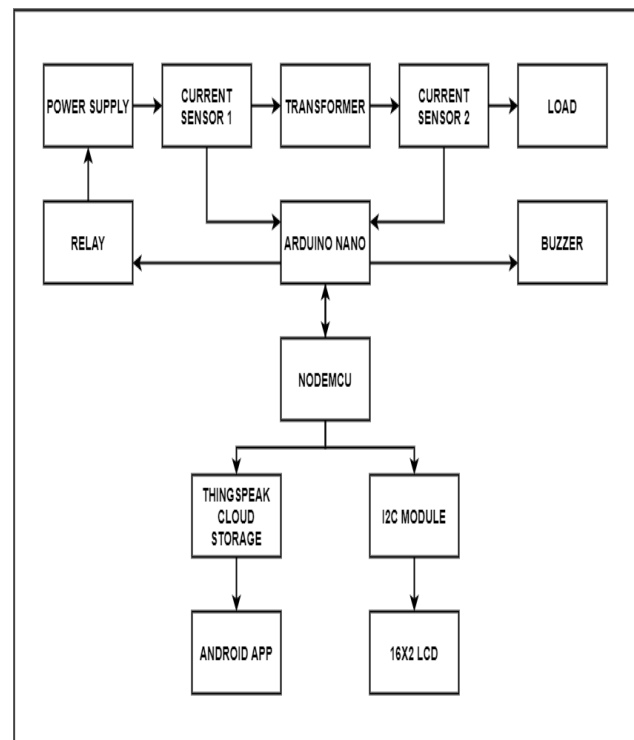
III. BLOCK DIAGRAM
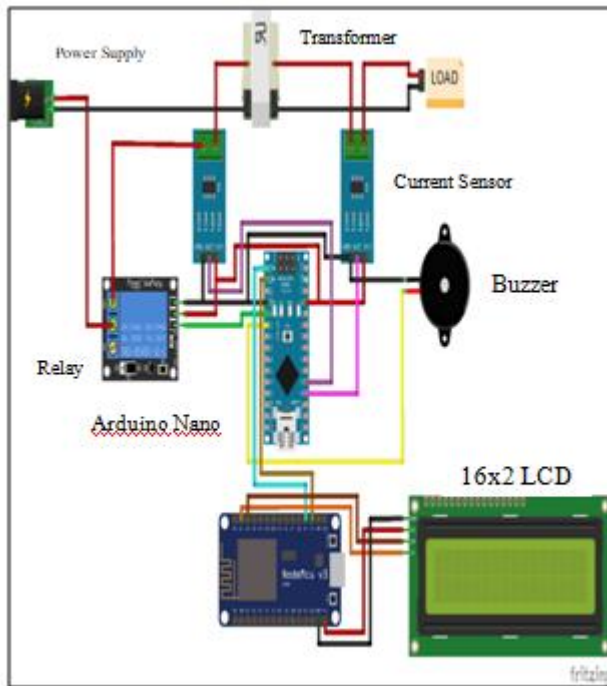

Fig.1.Block Diagram

IV. CIRCUIT DIAGRAM

Fig.2.Circuit Diagram

V. PRAPOSED METHDOLOGY

This project uses Arduino Nano and NodeMCU as the microcontroller. Arduino Nano is the main controller in this system. the current at both input and output of transformer is measured using current sensors. If both the currents are equal then the system operates in normal condition.If there is a difference in the current values then the relay switches off power supply to the system. The buzzer is activated when there is a difference between current values.I2C LCD Display is used to display current status of the system. The system can also be monitored using Android App specially designed for this system. The NodeMCU collects all the data from the Arduino Nano and uploads it to Thing Speak Cloud Storage. The Android App reads data from Cloud Storage and displays it.

V. CONCLUSION

From this project we have concluded that when internal fault occurs and the value of both currents are different the relay gets operated and the system gives alert by the sense of Arduino, so we come to know about abnormal working condition of transformer. Therefore, by using Differential protection scheme, transformer is protected from faults with the use of Arduino operating an electromagnetic relay.

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