

Real Time Distribution Transformer Monitoring System with Data Logging

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Abstract: — This project is about design and implementation of a mobile embedded system to monitor and record parameters of a distribution transformer like load currents, oil level and winding temperature, different gases and humidity present in the atmosphere. The idea of on-line monitoring system integrates a GSM Modem, with an Arduino UNO board and different sensors. It is installed at the distribution transformer site and the above parameters are recorded of the embedded system. The obtained parameters are processed and recorded in the system memory. If any abnormality or an emergency situation occurs the system sends SMS messages to the mobile phones containing information about the abnormality according to some predefined levels programmed in the microcontroller. This mobile system will help the transformers to identify problems before any serious failure.

Index Terms—Distribution transformer, Arduino UNO board, RF module, GSM, Sensors

I. INTRODUCTION

Distribution transformer is electrical equipment which distributes power to the end users directly, and its operation is an important parameter of the entire distribution network.

Distribution transformers are currently monitored manually where a person periodically visits a transformer site for maintenance and records parameter. This type of monitoring cannot provide information about overloads and overheating of transformer oil and windings. All these factors can significantly reduce transformer life. Our system is designed based upon online monitoring of key parameters of distribution transformers and which can provide useful Information about the health of transformers.

Operation of distribution transformer under certain condition guarantees their long life. However their life is reduced due to the failures of transformers in Temperature rise, low oil levels, over load, moisture present in the oil, and increase in unwanted dissolved gases in the transformer oil. Overloading and ineffective cooling of transformers are the major causes of failure in distribution transformers.

Online monitoring system consists of embedded system, GSM modem, mobile-users and sensors installed at transformer site. Sensors are installed on transformer side which reads and measures the physical quantity from the distribution transformer. The embedded module is located at

the transformer site. It is used to acquire process, display, transmit and receive the parameters from the GSM modem. GSM module is the link between the embedded system and the public GSM network. Another module that has a PC-based -server located at the control center.

Monitoring system based on RFID technology that has been used to monitoring and controls the parameters potential to be a more accurate and cheaper technique for health assessment of transformers.

II.RELEVANCE

Distribution transformers are one of the most important equipment in power network and today's society. Because of the large number of transformers distributed in a wide area in power electric systems, the data acquisition and transformer monitoring is an important issue. The main aim of this system is distribution transformer monitoring and controlling through GSM modem, RFID and Arduino based microcontroller.

III.OBJECTIVE

The objective of this project is to implement the accurate, good maintained and less human power for the distribution transformers, also to reduce the damages and increases the life of the distribution transformers.

IV.METHODOLOGY

1. First all sensors are installed in the transformer site for sensing the parameters of distribution transformers.
2. This sensed data is then connected to Arduino analog port by using connectors.
3. Then the signal is passed to the PC for monitoring purpose by using RF transmitter.
4. At the receiving end RF receiver is attached for receiving signals from the transformer site.
5. On the PC data of all sensors will be collected in the VB based software and it compares with predefined level.
6. If any abnormal situation occurs then the SMS will be sent to the control room by using a GSM modem.

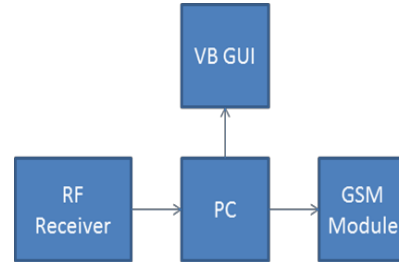


Fig-Transformer online monitoring unit

V. BLOCK DIAGRAM

In this project we dividing the total system into mainly two parts –

1. Data acquisition
2. Online monitoring

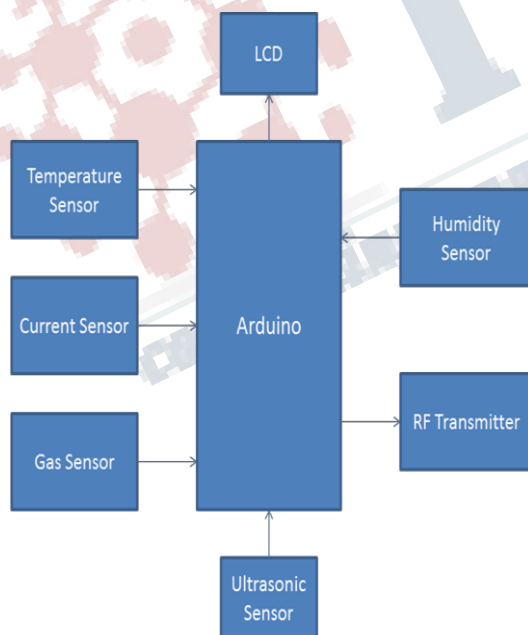


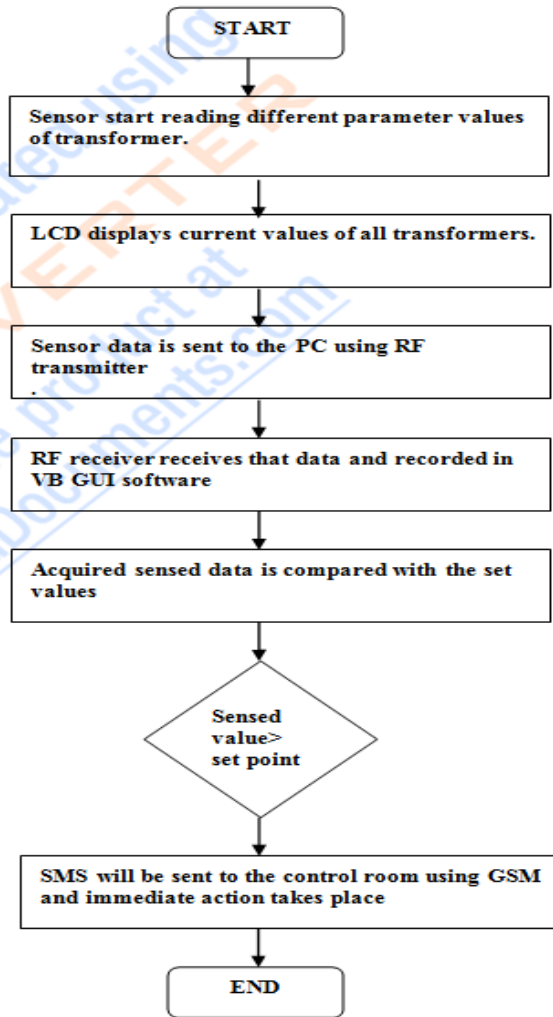
Fig- Transformer Data acquisition unit

VI. OPERATION

In this system, when we switched on the power supply the system will start working. When temperature of transformer increases above the set point then there is possibility of damage of the winding of transformer, then this message will be displayed on LCD to avoid this we can provide solution that is fans are get started to avoid the overheating of transformer. Also when current of transformer increase due to sudden increase in load in end user side, then immediately message is sent to the operator, then operator read this message and immediate action is taken place. Hence, transformer gets protected. A humidity sensor senses moisture present in the oil, measures and reports the relative humidity in the air, if humidity increases beyond set point then there are chances of short circuit or damage of transformer so immediate action takes place. Ultrasonic sensor used for level measurement of oil. These outputs of all sensors are in analog form and connected to the analog port of the Arduino based microcontroller. This data is sent to the data monitoring unit by using an RF transmitter.

At the side of transformer monitoring unit for online monitoring purpose the VB GUI software is developed which receives the data by using an RF receiver. In this software the sensor data is compared with threshold set values of all sensors. If values are in the given range then normal procedure will take place but if the sensor value exceeded beyond set point then there is an SMS will be sent to control room by using a GSM modem and required immediate action will take place.

VII. FLOWCHART

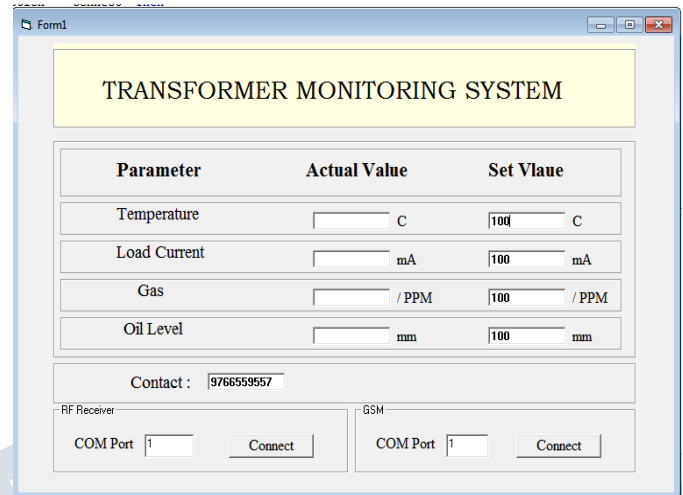


VIII. HARDWARE

1. Arduino UNO board(ATMega 328)
2. GSM SIM 300 Modem
3. RF Transmitter
4. RF Receiver
5. 16*2 alphanumeric LCD Display
6. Temperature sensor
7. Humidity sensor
8. Current sensor
9. Gas sensor
10. Ultrasonic sensor

IX. SOFTWARE

1. VB GUI



X. CONCLUSION

In real time distribution transformer monitoring system by using GSM, RFID module and different sensors online monitoring of transformer is possible instead of manual monitoring. So we can reduce the man power and provides the effective security.

REFERENCES

1. Ansuman Sharma, Rajesh Behura, "GSM based Distribution Transformer Monitoring System" National Institute of Technology Rourkela-769008 (ODISHA) May-2013
2. Rakesh Kumar Pandey, Dilip Kumar, "Distributed Transformer Monitoring System Based On Zigbee Technology" International Journal of Engineering Trends and Technology (IJETT) - Volume4Issue5- May 2013
3. Nagargoje Surekha, Abhishek Kumar, Mr. Daniel A. Figueiredo, "Monitoring and Controlling Of Distribution Transformer via GSM Modem", Volume 4, Issue 7, July 2014 ISSN: 2277 128X

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