

GSM BASED TRANSFORMER MONITORING USING APP

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ABSTRACT:

The system is very useful in the manufacturing industries where the transformer is used for powering the machineries. The objective of this project is to monitor and protect if the transformer parameters such as primary and secondary voltage and temperature level are exceed above the normal value. When load voltage is above the rated voltage, the transformer windings are spoiled some time the transformer may burst. So this is designed to protect the transformer if any one parameter such as primary voltage, secondary voltage, current and temperature range exceed the normal value.If any emergency or aberrant conditions occur the system sends information throughSMS to the mobile phones, by using GSM Modem.

In this work we are going to monitor the voltage, current and temperature. Voltage to the load is measured with the help of a voltage sensor. Current consumed by the load is measured with the help of a current transformer. Then the rectified output will be given to the micro controller through an

analog to digitalconverter. Analog to digital converter convert the input analog signal to corresponding digital signal which is given to microcontroller. we use this technology for multiple home based applications like security,automation and remote sensing using application.

INTRODUCTION:

In normal ways all the Industrial or Electrical machineries are controlled by the manual operation. Hence there is step by step progress but most of the time there is not actually instant co-operation between system and operator in case of emergency or fault type situation.Therefore we are designing a system where there exists communication between system and operator. For this we are using Transformer, microcontroller,analog to digital converter. As we know Distribution transformer is a major component of power system and its correct functioning is vital to system operations. To reduce the risk of unexpected failure and the ensuing unscheduled outage, on-line monitoring has become the common practice to assess continuously the condition of the transformer with. This work presents design and implementation of a system to monitor and record key operation of a distribution transformer like overvoltage, over current, temperatures, rise or fall of oil level. Sensors, including a Temperature Detector, current sensor and voltage sensor according to manufacturers' specifications are calibrated and tested by power distribution monitoring

offices. The system is installed at the distribution transformer site and by measuring above parameters it will help the utilities to optimally utilize transformers and identify problems before any catastrophic failure.

The main objectives are to prevent forced outages, indicate acceptable overload, assess the remaining insulation-life and reduce maintenance costs. To achieve these goals, the monitoring system manufacturers must follow strategies, which are in line with the interests of transformer owners. Transformer is the key equipment in power system, to ensure its safe and stable operation is important.

Distribution transformer is a critical equipment in power system operation which distributes power to the low-voltage users directly. Operation of distribution transformer under rated condition (as per specification in their nameplate) guarantees their long life. However, their life span and reliability is significantly reduced if they are subjected to overloading, resulting in unexpected failures and loss of supply to a large number of customers thus affecting system reliability. Overloading and ineffective cooling of transformers are the major causes of failure in distribution of key parameters are necessary for evaluating the performance of the distribution transformer and also helpful to avoid or reduce disruption due to sudden unexpected failures. Monitoring in the context of this research entails remote collection of data and include sensor

development, measurement techniques for real-time application.

Transformers either raise a voltage to decrease losses, or decrease voltage to a safe level. "Monitoring" is here defined as on-line collection of data and includes sensor development, measurement techniques for online applications. It is very difficult and expensive to construct the communication wires to monitor and control each distribution transformer station. Here GSM is used for communicating the monitored parameters. The failures of transformers in service are broadly due to: Over Load condition temperature rise, low oil levels, over load, Earth grounding, and improper installation and maintenance. Out of these factors temperature rise, and over load, need continuous monitoring to save transformer life. A distributed transformer networks remote monitoring system increases the reliability of distribution network, by monitoring critical information such as temperature, current and voltage of the transformer. Data are collected continuously. Monitoring the transformers for problems before they occur can prevent faults that are costly to fix and result in a loss of service life.

METHODOLOGY

Transformer can be a part of a set of equipment designed for reducing & increasing the current and electrical power. Transformer can be key inside land area as a result it is important during broadcast and allocation set of connections. The normal scheme in the direction of provide by means of a protect

rearing used for the transformer which be distributecommand in the direction of assured area since redundantcontiguous. The transformer confined through graceful thetransformer on or after the leading make available by meansof microcontroller based relay. In irregularity situation indistribution transformer is attain pole away from each otherby way of incongruity within limits similar, short circuit,snaking high temperature, oil temperature, ambient heat,bushing issue, load current issues, winding issues. As a resultwe are operate by way of inner issues. ConsequentThe normal scheme in the direction of provide by means of aprotect rearing used for the transformer which be distributecommand in the direction of assured area since redundantcontiguous. The transformer confined through graceful thetransformer on or after the leading make available by meansof microcontroller based relay. In irregularity situation indistribution transformer is attain pole away from each otherby way of incongruity within limits similar, short circuit,snaking high temperature, oil temperature, ambient heat,bushing issue, load current issues,winding issues. as a resultwe are operate by way of inner issues. consequentprotection approach used for transformer is included in thisexpansion work.

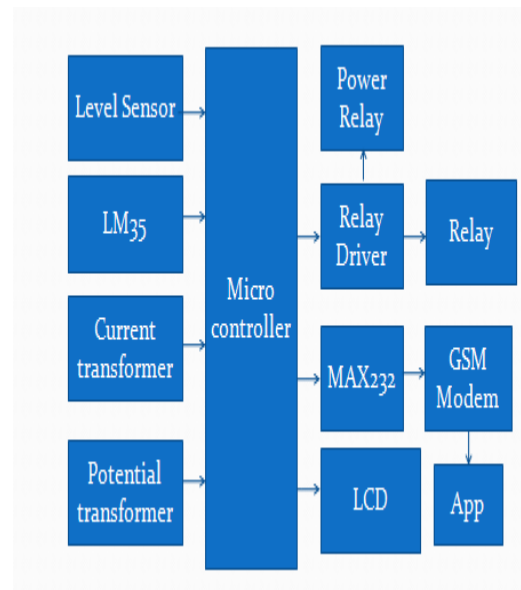


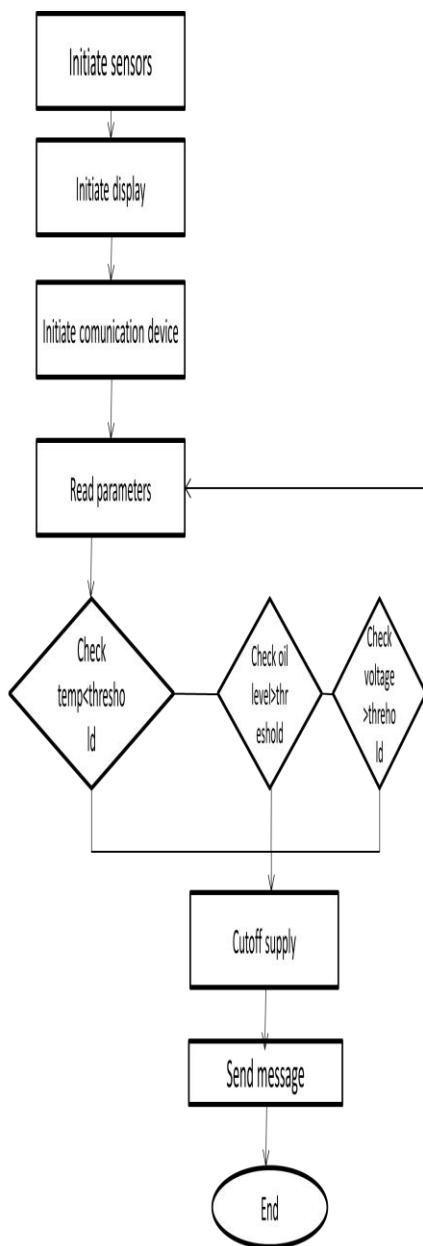
Fig 1:Block Diagram

This project uses a GSM modem connected with Micro controller. The Micro controller is interfaced with sensors and relays through interfacing circuits.A 12V power supply provides required power.LCD is used to display the actions performed.Here we are using the application to indicate the problem and to rectify it.Using this application the transformer faults are found and corrected.



Fig 2:Hardware

There are Two transformer :Potential & Current Transformer. When the supply is given to the potential transformer(Step-up) the voltage gets increased to measure it. The Bridge rectifier converts the AC to DC voltages. The Capacitor used in it reduces the noises present. Potential Divider gives the required amount of voltage by the Microcontroller .These are similar to the Current Transformer, but here it is a step-down transformer.



RESULT:

Alert, Trans Fault
 Volt: 190
 Curr: 1
 Temp: 32
 Oil: No

2:10 PM

Alert, Trans Fault
 Volt: 190
 Curr: 1
 Temp: 32
 Oil: No

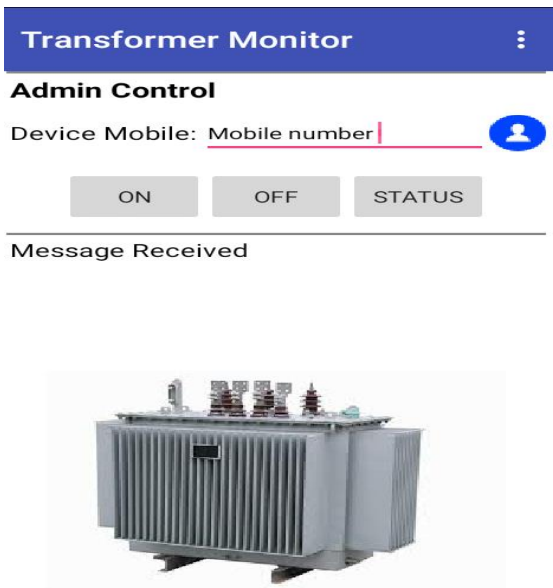
2:10 PM

Alert, Current High
 Volt: 180
 Curr: 60
 Temp: 30
 Oil: Yes

10:58 AM

Alert, Trans Fault
 Volt: 194
 Curr: 20
 Temp: 30
 Oil: No

11:14 AM



CONCLUSION:

The project “**DISTRIBUTION TRANSFORMER PROTECTION BY USING GSM MODEM**” has been completed successfully and the output results are verified. The results are in line with the expected output. The project has been checked with both software and hardware testing tools. In this work “LCD, Arduino, current sensor, voltage sensor, temperature sensor, GSM and relay” are chosen are proved to be more appropriate for the intended application. The project is having enough avenues for future enhancement. The project is a prototype model that fulfills all the logical requirements. The project with minimal improvements can be directly applicable for real time applications.

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