Transformer protection using GSM technology

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ABSTRACT

This project is about design & implementation of a mobile embedded system to monitor & record key parameters of a distribution transformer like load currents, oil level & ambient temperature. The GSM system will help the transformer to operate smoothly & identify problems before any failure.

KeyWord: *Microcontroller, transformer , sensors , gsm etc...*

1 INTRODUCTION

In power systems, distribution transformer is electrical equipment which distributes power to the low-voltage users directly, and its operation condition is an important component of the entire distribution network operation. Operation of distribution transformer under rated condition(as per specification in their nameplate guarantees their long life .However, their life is significantly reduced if they are subjected to overloading, resulting in unexpected failures and loss of supply to a large number of customers thus effecting system reliability. Overloading and ineffective cooling of transformers are the major causes of failure in distribution transformers [2]-[4]. The monitoring devices or systems which are presently used for monitoring distribution transformer exist some problems and deficiencies. Few of them are mentioned below.

(1) Ordinary transformer measurement system generally detects a single transformer parameter, such as power, current, voltage, and phase. While some ways could detect multi-parameter, the time of acquisition and operation parameters is too long, and testing speed is not fast enough.

(2) Detection system itself is not reliable. The main performance is the device itself instability, poor anti-jamming capability, low measurement accuracy of the data, or even state monitoring system should is no effect.

(3) Timely detection data will not be sent to monitoring centers in time, which can not judge distribution transformers three-phase equilibrium.

(4) A monitoring system can only monitor the operation state or guard against steal the power, and is not able to monitor all useful data of distribution transformers to reduce costs.

(5) Many monitoring systems use power carrier communication to send data, but the power carrier communication has some disadvantages: serious frequency interference, with the increase in distance the signal attenuation serious, load changes brought about large electrical 2 noise. So if use power carrier communication to send data, the real-time data transmission, reliability cannot be guaranteed.

1.1 BACKGROUND OF THE PROJECT

Abnormality in distribution transformer is accompanied with variation in different parameters like Winding temperature , Top and bottom oil temperatures, Ambient temperature, Load current, Oil flow (pump motor), Moisture in oil ,Dissolved gas in oil, Bushing condition, LTC monitoring, Oil level. However, we are dealing with oil temperature and load current.

Online monitoring system consists of embedded system, GSM modem, mobile-users and GSM networks and sensors installed at transformer site Sensors are installed on transformer side which reads and measures the physical quantity from the distribution transformer and then it converts it into the analog signal. The embedded module is located at the transformer site. It is utilized to acquire, process, display, transmit and receive the parameters to/ from the GSM modem. The second is the GSM module. It is the link between the embedded system and the public GSM

network. The third is utility module that has a PC-based -server located at the utility control center. The server is attached to GSM modem and received transmits SMS from/to the transformer site via the GSM module.

2. DISCRIPTION

2.1 Microcontroller

The AT89C52 is a low-voltage, high-performance CMOS 8-bit microcomputer with 8 Kbytes of Flash Programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high density non-volatile memory technology and is compatible with the industry Standard MCS-51Ô instruction set and pin out. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful microcomputer which provides a highly highly flexible and cost effective solution to many embedded control applications.


2.2 LCD Display

The display used is 16x2 LCD (Liquid Crystal Display); which means 16 characters per line by 2 lines. The standard is referred as HD44780U, which refers to the controller chip which receives data from an external source (Here Atmega16) and communicates directly with the LCD. Here 8-bit mode of LCD is used, i.e., using 8-bit data bus. i.e., using 8-bit data bus.

2.3 GSM Modem

A GSM Modem is a specialized type of modem which accepts a sim card and operates over subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective. The term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocol in the GSM


2.4 Relay Circuit
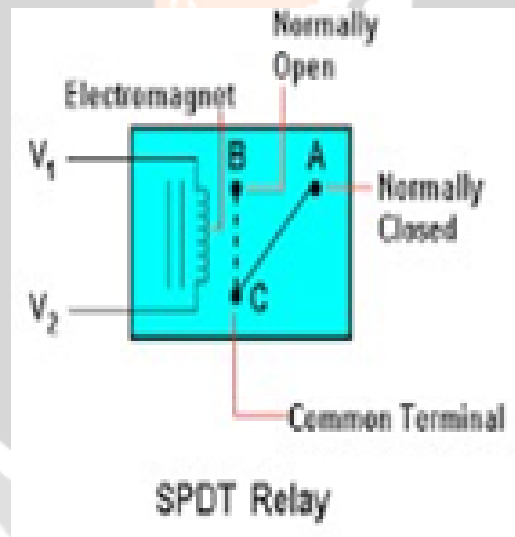
Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often use to interface an electronic circuit to an electrical circuit which works at very high voltage. In basic relay there are three contactors normally open (NO), normally close (NC), a common (COM). At no input state, the COM is connected to NC. When the operating voltage is applied to relay coil gets energized and COM changes to NO contact.

3. BLOCK DIAGRAM
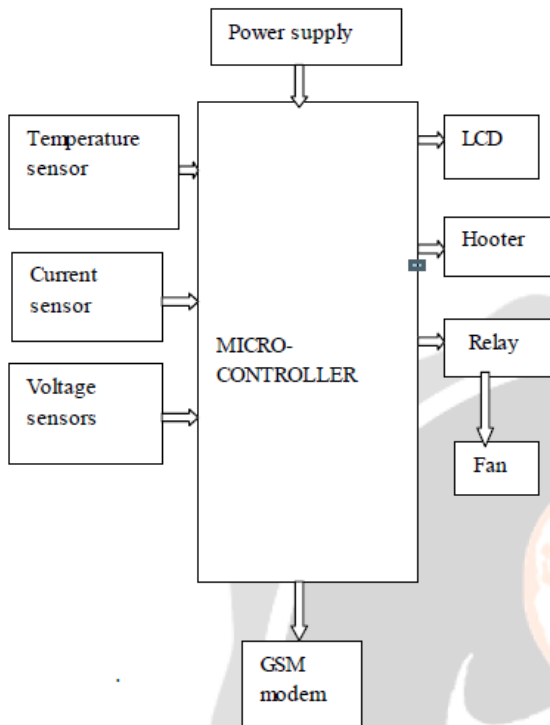
3.1.FLOW CHART
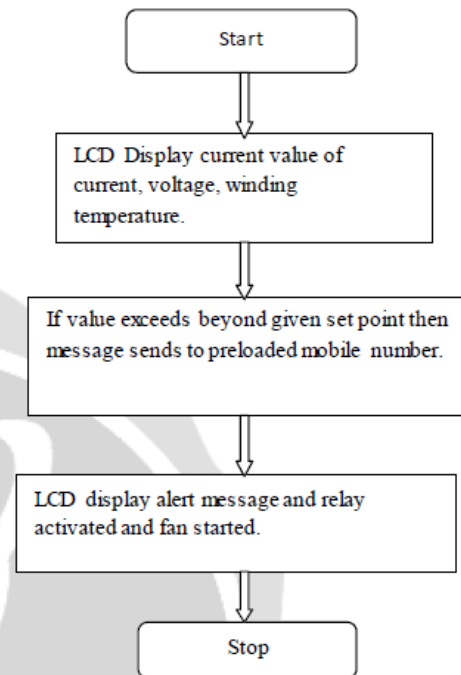
4. RESULT

In this system,when temperature of transformer increases beyond the set point then there is possibility of damage the winding of transformer ,to avoid this 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 send to the operator, then operator read this message and immediate action is takes place.Hence,transformer get protected.

5. CONCLUSION

We design this system to protect distribution transformer from overheating and overloading.

6 REFERENCES

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