

# GSM BASED DISTRIBUTION TRANSFORMER MONITORING AND CONTROLLING SYSTEM

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**ABSTRACT:** This system is about design and implementation of a mobile embedded system to monitor and record key parameters of a distribution transformer like load currents, over voltage, oil level, winding temperature and ambient temperature. The idea of on-line monitoring system integrates global service mobile (GSM) Modem, with a single chip microcontroller and different sensors. It is installed at the distribution transformer site and the above parameters are recorded using the analog to digital converter (ADC) 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 (short message service) messages to the mobile phones containing information about the abnormality according to some predefined instructions programmed in the microcontroller. This mobile system will help the transformers to operate smoothly and identify problems before any failure.

**Keywords:** Microcontroller, Transformer, sensors, GSM....etc

## I. INTRODUCTION

In recent years, electrical power system is spread all over the word; hence there is transfer of large electrical power from generating station to the end users. Hence it is necessary to monitor the operating condition of distribution transformer when it is loaded. However, there life is significantly reduced if they are over loaded, resulting in unexpected failures and loss of supply to a large number of customers. Thus effecting system reliability .Few power companies use Supervisory Control and Data Acquisition(SCADA) system for online monitoring of distribution transformer is an expensive. Distribution transformers are connected directly to the load side hence most of the possibility of fault is at distribution transformer due to sudden variation in load. Shut down of large load .distribution transformers are currently monitored by manual monitoring does not gives current value of some parameters like overload current and overheating of transformer oil. This factor can reduce transformer life. Our system is designed based upon online monitoring of operational parameters of distribution transformer can provide useful information about the health of transformers. Which will help the utilities to optimally use their transformers and keep the control in operation for a longer period. This System will help us to identify problems before any fault occurs in transformer, resulting in a long life service for transformer. This system is based on embedded we are using microcontroller embedded systems are self contained programs that are embedded within the hardware.

## DISCRIPTION



### Microcontroller

The AT89C52 is a low-voltage, high-performance CMOS 8-bit micro computer with 8Kbytes 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-51 instruction set and pin out. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful micro computer which provides a highly flexible and cost effective solution to many embedded control applications.

## II. LCD Display



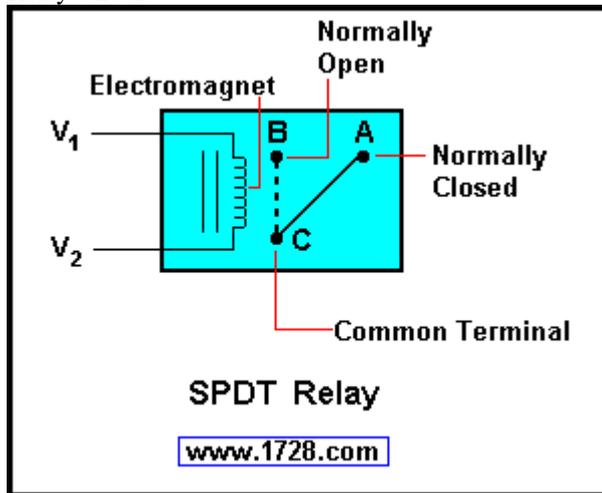
The display used is 16x2LCD (Liquid Crystal Display); which means 16 characters per line by 2 lines. The standard is referred as HD44780U, which refers to the controller chip which receives data from an external source (Here Atmega16) and communicates directly with the LCD. Here 8-bit mode of LCD is used, i.e., using 8-bit databus.

## GSM Modem



A GSM Modem is a specialized type of modem which accepts a sim card and operates oversubscription 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.

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 work sat 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 torelay coil gets energized and COM changes to NO contact.

BLOCK DIAGRAM

GSM Based Control System

1.3 Block Diagram

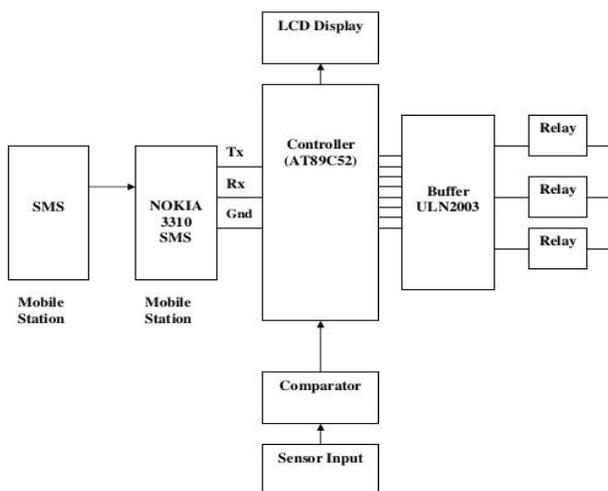


Fig 1.3: System Block Diagram

III. 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.

IV. CONCLUSION

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

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