GSM Based Transformer Oil Temperature Monitoring System

Pallavi Hajare[1] Shorti Zade[2] Priyanka Kambd[3] Chaitali Gohane[4] Nisha Badole[5]
[1,2,3,4,5]Department of Electrical Engineering
[1,2,3,4,5]Tulsiramji Gaikwad Patil College of Engineering and Technology Nagpur, India

Abstract— This project is about design and implementation of a mobile embedded system to monitor and record key parameters of a distribution transformer like load currents, oil level and ambient temperature. The idea of on-line monitoring system integrates a global service mobile (GSM) Modem, with a standalone 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 catastrophic failure.

Keywords: Global Service Mobile (GSM), Oil Temperature Monitoring System

I. 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 if 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 multipara meter, 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 cannot 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

II. BACKGROUND OF THIS 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.

A. Block Diagram in Figure:

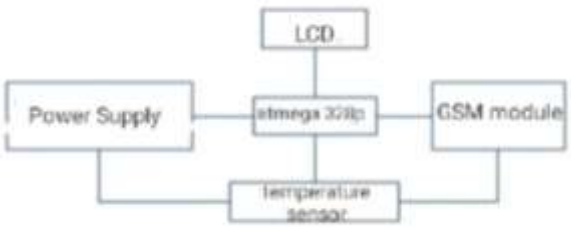
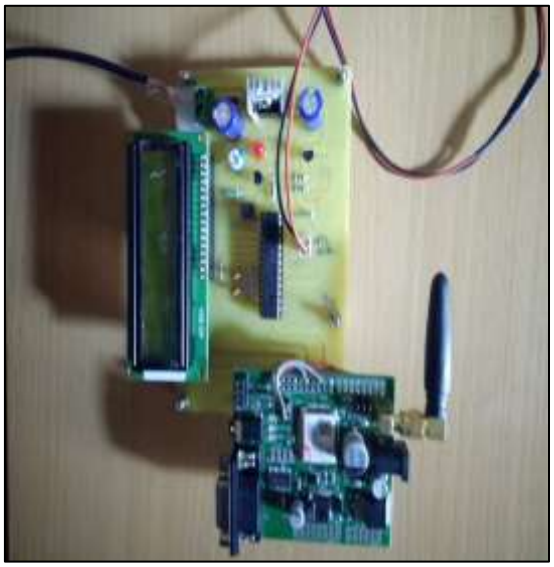


Fig. 1: Block Diagram

III. RESULT

Because oil tiers cannot be monitored manually, GSM-primarily based totally tracking of distribution transformers is a long way Greater beneficial and reliable than guide tracking. This era turned into created to save you overheating and overloading of distribution transformers. Guide tracking.



IV. CONCLUSION

The gsm based monitoring of distribution transformer is quite useful as compared to manual monitoring and also it is reliable as it is not possible to monitor always the oil level, oil temperature rise, ambient temperature rise, load current manually. After receiving of message of any abnormality we can take action immediately to prevent any catastrophic failures of distribution transformers. In a distribution network there are many distribution transformers and associating each transformer with such system, we can easily figure out that which transformer is undergoing fault from the message sent to mobile. We need not have to check all transformers and corresponding phase currents and voltages and thus we can recover the system in less time. The time for receiving messages may vary due to the public GSM network traffic but still then it is effective than manual monitoring.

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