GSM BASED TRANSFORMER HEALTH MONITORING SYSTEM

Md.Imran [1], R.Surender Reddy [2]

[1] Md.Imran, Mtech Student, Lords Institute of Engineering and Technology, Himayath sagar, Telangana, India

[2] R.Surender Reddy, MTech, Assistant Professor. Lords Institute of Engineering and Technology, Himayath sagar, Telangana, India

I. ABSTRACT

The Transformer is a vital part of the transmissions and distribution systems. Monitoring transformers for problem before they occurs can prevent fault that are costly to repair & results in a loss of services. Current system can provides information about the state of a transformers, but are either offline or very expensive to implement. Transformer is essential part of power transmission system, are costly, as is the cost of power interruption. Because of the costs of scheduled & unscheduled maintenance, especially at remote site, the utility industry has begun investing in instrumentation & monitoring of transformers. Online transformer diagnostics using conventional technologies like carrier power line communications & Radio frequency based control systems & Supervisory controls & data acquiring system, Distributed control systems & Internet based in communications are having their own limitation. GSM is an open digital cellular technology use for transmitting mobiles voice & data services. This project objective is to develop low cost solution for monitoring health conditions of remotely located distributions transformers using GSM technology to prevent premature failures of distributions transformers & improving reliability of services to the customers. In this project we designed a system in such a way that it will monitor the load of the transformer continuously and that information is transferred to the smart phone. These parameters are displayed on the phone. In the display unit we can view the continuous information of transformer i.e. due to what reason the transformer has failed, when the power is restored etc

Keywords: ***Microcontroller (LPC2148), Energy meter, Voltage sensor, Current sensor, Temperature sensor, GSM.***

II. INTRODUCTION

In recent years increase emphasis has placed on powers reliability & economy. In particular major change in utility industries has caused increased interest in more economical and reliable method to generate & transmit & distributes electric power. In this regards monitoring the health of equipments constituting the systems is critical to

assure that the supply of power can be meet the demand. The main concern with transformer protection is protecting the transformer against internal faults and ensuring security of the protection scheme for external faults. System conditions that indirectly affect transformers often receive less emphasis when transformer protection is specified. Overloading power transformers beyond the nameplate rating can cause a rise in temperature of both transformer oil and windings. If the winding temperature rise exceeds the transformer limits, the insulation will deteriorate and may fail prematurely. Over current is the current flowing through the transformer resulting from fault on the power systems. Faults current that do not includes ground are generally in excess of four time full load currents, faults current that includes ground can be below the full load currents depending on the systems grounding methods

III. PROPOSED METHOD

In the proposed system we are using voltage, current sensor also temperature sensor to monitor condition of distribution transformer. If any of these parameters is increases above the threshold value then microcontroller generate signal to turn OFF device, also it will send message to authority as a SMS by using GSM Module.

IV. BLOCK DIAGRAM

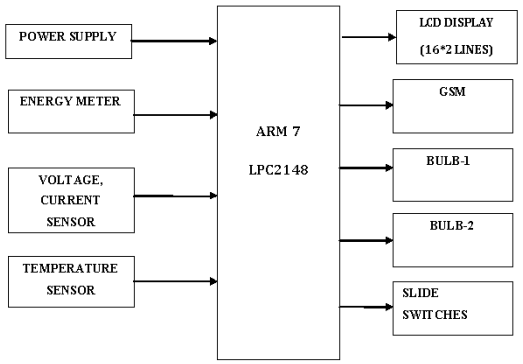


Fig. System block diagram

System Overview:

Power Supply: This section is meant for supplying Power to all the sections mentioned above. It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes. Here diodes are used to rectify the ac to dc. After rectification the obtained rippled dc is filtered using a capacitor Filter. A positive voltage regulator is used to regulate the obtained dc voltage.

Microcontroller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7 TDMI:

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

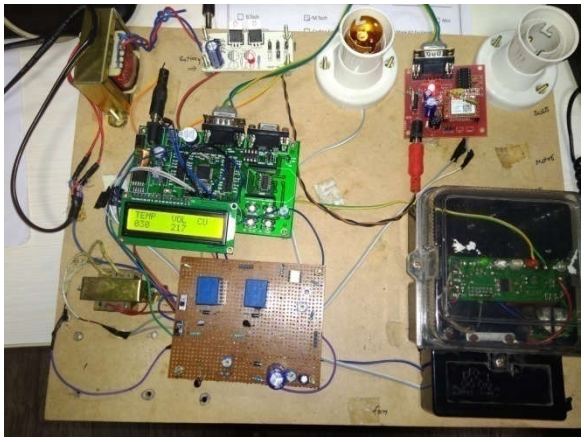
GSM modem Section: This section consists of a GSM modem. The modem will communicate with microcontroller using serial communication. The modem is interfaced to microcontroller using MAX 232, a serial driver. The Global System for Mobile Communications is a TDMA

Temperature sensor: Thermistors are a temperature sensing devise. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

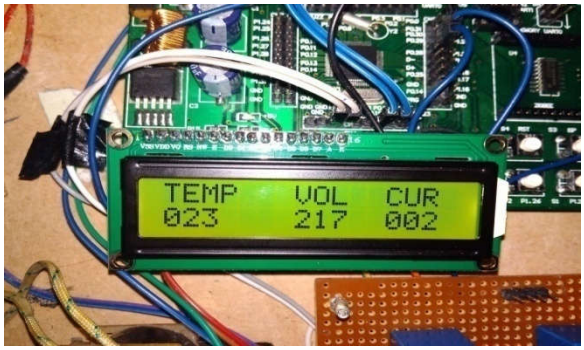
Energy meter: An electricity meter or energy meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered device. Electricity meters are typically calibrated in billing units, the most common one being the kilowatt hour. Periodic readings of electric meters establishes billing cycles and energy used during a cycle.

Current Sensors: Measuring a voltage in any system is a "passive" activity as it can be done easily at any point in the system without affecting the system performance. However, current measurement is "intrusive" as it demands insertion of some type of sensor which introduces a risk of affecting system performance. Current measurement is of vital importance in many power and instrumentation systems. Traditionally, current sensing was primarily for circuit protection and control. However, with the advancement in technology, current sensing has emerged as a method to monitor and enhance performance.

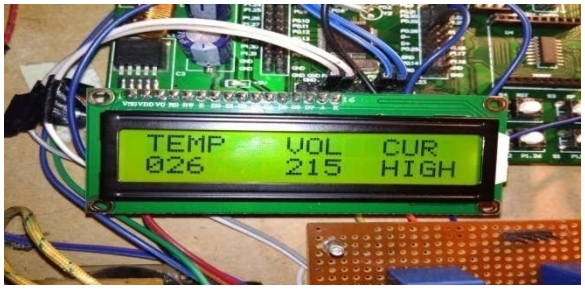
V. RESULTS



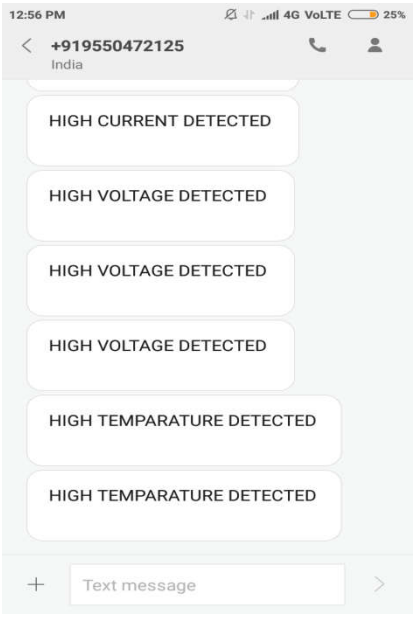
Fig(5.1) System in normal stage



Fig(5.2) All parameters are shown in LCD Display



Fig(5.3) If any one parameter is high then it will display on LCD



Fig(5.4) SMS alert on Mobile

VI. CONCLUSION

Transformers are among the most generic and expensive piece of equipment of the transmission and monitoring system. Regular monitoring health condition of transformer not only is economical also adds to increased reliability. In the past, maintenance of transformers was done based on a pre-determined schedule. With the advancement of communication technology now it is possible to receive fault information of transformer through GSM technology remotely to the operator and authorities so one can able to take possible solution before converting fault in to fatal situation.

VI. REFERENCES

[1] Leibfried, T, "Online monitors keep transformers in service", Computer Applications in Power, IEEE, Volume:11 Issue: 3 , July 1998 Page(s):36 -42.

[2] Chan, W. L, So, A.T.P. and Lai, L., L.; "Interment Based Transmission Substation Monitoring", IEEE Transaction on Power Systems, Vol. 14, No. 1, February 1999, pp. 293-298.

[3] Par S. Tenbohlen,T. Stirl, M. Rösner," Benefit of sensors for on-line monitoring systems for power transformers"

[4] T. D. Poyser, "An On-Line Microprocessor Based Transformer Analysis System to Improve the Availability and Uti'lization of Power Transformers". IEEE Trans. On Power Apparatus and Systems, Volume PAS-102, April 1983, pp.957-962.

[5] Muhammad Ali Mazidi , Janice Gillispie Mazidi, Rolin D.Mckinlay, The 8051 Microcontroller And Embedded Systems Using Assembly And C,Second Edition, Pearson Education, 2008, India.

[[6]. Jyotishman Pathak, Yuan Li, Vasant Honavar and James D. McCalley, "A Service-

Oriented Architecture for Electric Power Transmission System Asset Management", In ICSOC Workshops, pp: 26-37, 2006.

[7]. B. A. Carreras, V. E. Lynch, D. E. Newman and I. Dobson, "Blackout Mitigation Assessment in Power Transmission Systems", Hawaii International Conference on System Science, January 2003.

[8]. Xiaomeng Li and Ganesh K. Venayagamoorthy, "A Neural Network Based Wide Area Monitor for a Power System", IEEE Power Engineering Society General Meeting, Vol. 2, pp: 1455-1460, 2005.