Real Time Transformer Parameter Monitoring and Protection by Using GSM Modem

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Abstract— The aim of this project is to improve the performance of transformer by monitoring transformer parameter automatically and taking necessary action if there is any critical condition using a GSM modem. The project work focuses on the automatic monitoring of transformer parameter, Current, voltage, oil level, oil temperature. This is accomplished by using microcontroller, sensors, GSM modem and IF application. Distribution transformer widely used in power system for step down the voltage level. The sensors senses all the parameters and send to Microcontroller, Microcontroller and GSM interfaced with each other so we have get all the parameters of distribution transformer on Mobile. This device increases the uptime of the networks and also provides early warning in case of malfunction.

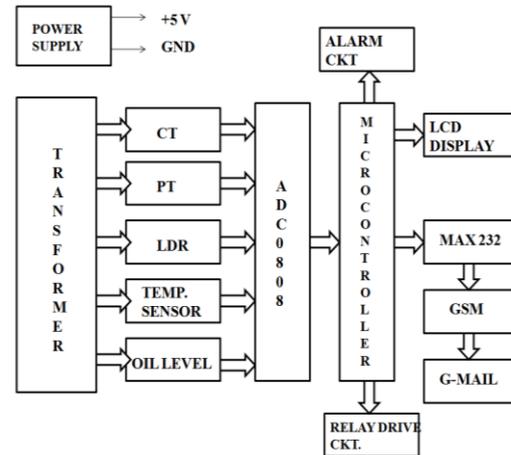*Key words:* Distribution Transformer, GSM, SMS, Sensors, ADC, Microcontroller

I. INTRODUCTION

The demand of the electric power is used in commercial, domestic and industrial purpose increased in recent years. The existing method transformer parameter is manually monitored for maintenance purpose. This is very time consuming and costly due to the large number of distribution transformer is present in power system. If any one of the transformer get failure then entire system is affected to avoid this monitoring of transformer and protection is necessary. Among the all the power system equipment transformer play main role for stepping up or stepping down voltage level on the principle of electromagnetic induction. In existing system monitoring of transformer is done using temporary test unit and involving man action, in this method continuous monitoring of transformer parameter is not possible. If any abnormal condition is happen which may lead to failure or malfunction of transformer. Our Proposed system provides effective monitoring and protection of distribution transformer by measuring it current, operating voltage, oil temperature, winding temperature, oil level without involving human intervention.

II. SYSTEM BLOCK DIAGRAM DESCRIPTION

As shown in fig the block diagram of Real time transformer parameter is monitoring and protection using GSM. In this we are measuring various parameters. The following sensors are used for monitoring transformer parameter:
1) Current transformer.
2) Voltage transformer.
3) Oil level sensor
4) Fire sensor
5) Temperature sensor.

Fig. 1: Block for monitoring transformer

A. Potential transformer

It is connected with input line in order to measure the voltage input to the transformer winding, output of the potential transformer is amplified and fed to microcontroller .If the value that is being monitored continuously and if its value increases beyond the rating then relay trips and alarm starts functioning in the control room.

B. Light dependent resistor:

LDR is mounted near to the transformer bushing and conductor, it protect the transformer due to spark occur whenever loose connection obtain between bushing and conductor. It is predicted by the intensity of sparking between transformer bushing and conductor. Its resistance varied when intensity of light changes. The output of LDR is fed to microcontroller if its value increases beyond limit then relay drive circuit is operated and transformer is automatically shut down.

C. Float sensor

Float sensor is mounted inside the transformer reservoir tank immersed into the oil. As the level of the oil inside the tank decreases below 70% the signal is send to micro controller hence relay drive circuit is operated and transformer is automatically disconnected.

D. Temperature sensor

LM35 temperature sensor is kept immersed in the transformer oil tank. The resistance of the temperature sensor varies as the temperature of oil varies. If the temperature values increases beyond 90°c then relay drive circuit is operated and transformer is automatically shut down. If the temperature reaches the critical level alarm operates at control room.

E. GSM module

The wireless GSM receiver is placed at the receiver end. Here we are using GSM SIM300 within built of GPRS. The signals are transmitted through GPRS which is received on the Gmail and also through SMS.
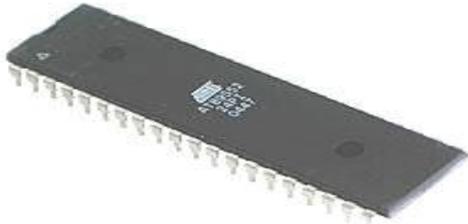
F. Microcontroller (AT89S52)

Fig. 1.2: Microcontroller IC (AT89S52)

Microcontroller of series AT89S52 is used in the proposed model. The various parameter that are monitored in this system are fed to the microcontroller is fed to various ports. The spark between bushing and conductor is monitored through LDR its signal is fed to the controller through the port 1. The signal from the float sensor is fed to the port1. The relay terminals are connected across D port. The signal from LM35, CT and PT is fed to port 2. LCD will get the signal from Port 3.

III. SIMULATION WORK

The figure1.4 shows the simulation of the proposed project model, it shows the various parameter to be monitored in the transformer. The voltage represents the input voltage level of the transformer, temperature tag indicates the temperature level of the transformer oil, oil level tag indicates the level of oil in the transformer tank and current represent the load current.
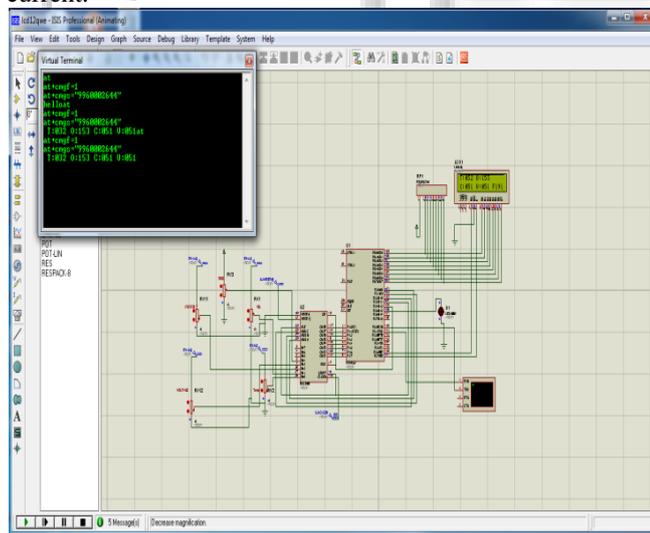

Fig. 1.3: Simulation of proposed model

There is continuously monitoring and display of all above parameter and also if anyone of the parameter exceeds or below its predefined value then transformer is automatically shut down till the parameters in its normal range, this is shown by green LED.

IV. HARDWARE-SETUP

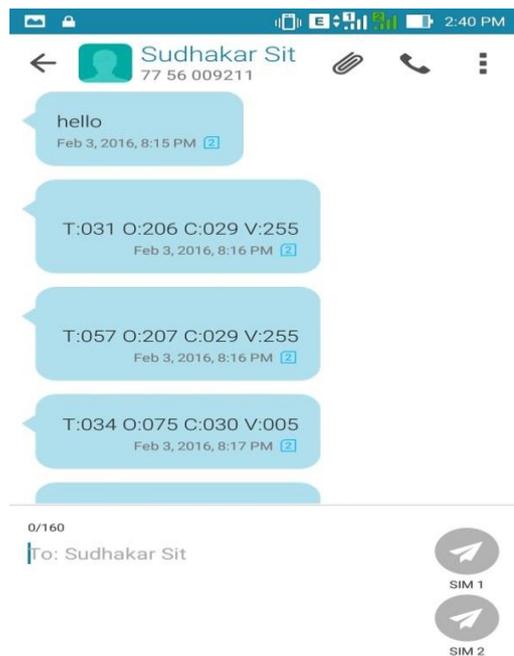Fig. 1.4: Hardware Proposed model.

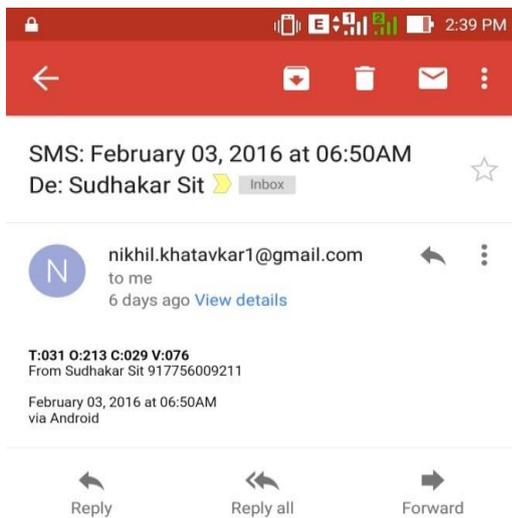## V. RESULT

Fig. 1.6: Results on Mobile

Fig. 1.7: Results on Gmail

VI. CONCLUSION

The GSM based transformer parameter monitoring is useful than manual monitoring of distribution transformer like monitoring of Oil level,ambient temperature, current, voltage. If any abnormal condition is happen then we can take necessary action on that after getting SMS. Hence this can be applied in real time system monitoring and satisfactory result can be obtained.

REFERENCES

[1] Electrical technology volume 3rd and 4th by- B. L. Theraja
[2] "*Microcontroller and its application*"- mohammadali mazdi
[3] The 8051 Micro-Controller Architecture By: Kenneth, J. Ayala.
[4] B. Vijayalakashmi, R. Punitha, C. Ram Kumar, M. Bhanupriya " *Power transmission monitoring using wireless zigbee technology*" Globel Journals Inc. (USA), (Online ISSN 2249-4596)Volume 13,Issue. 16 Version 1.0 Year 2013.
[5] S. Dharanya, M. Priyanka, R. Rubini and A. Umamakeswari "*Real time monitoring and controlling of transformer*" Journal of Artificial Intelligence 6 (1):33-42, 2013, (ISSN 1994-5450)/ DOI: 10.3923/jai.2013.33.42.
[6] N. Nagaraju, M. S. Kiruthika. "*FAULT SENSING IN REMOTETRANSFORMER USING GSM & USING AUTOMATIC ON/OFF STREET LAMPS*" IJAREEIE, (ISO 3297: 2007) volume 2, Issue 10, October 2013.
[7] D. S. Suresh, Prathiba T, Kouser Taj. "Oil Based transformer Health Monitoring System" IJSR, (ISSN: 2319-7064), Impact Facotr (2012): 3.358.