GSM BASED DISTRIBUTION TRANSFORMER MONITORING SYSTEM

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ABSTRACT

In distribution network distribution transformer plays very important role. It is electrical equipment which distributes power to 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 guarantees their long life. However, their life is significantly reduced if they are subjected to overloading, reduction in oil level in conservator and increase in temperature. The aim of this project is to protect the distribution transformers from burning due to the overload, increase in temperature and if there is reduction of oil level in the conservator, sufficient cooling would not be provided. Hence by monitoring these parameters, we can increase the life of transformer. So, in this project we designed a system in such a way that any problem in the transformer regarding overload, over heat or reduction oil level in conservator, information will be transferred to the smart phone through GSM (Global System for Mobile). We can also view the continuous information of above parameters of transformer in LCD display provided in the system. So it is easy for the respective maintenance staff of the department to have continuous vigilance over the transformer.

**Keywords:** GMS, transformer, LCD.

I.   INTRODUCTION

Transformer is the main equipment its play very important role in industry, substation and other generation section etc. transformer is a static device which transfer electrical power one or more circuit through electromagnetic orientation. The transformer failures result in loss, not only on account of repair or replacement of failed transformer, but also, the revenue loss to the utility on account of power not supplied to the consumers. The transformer failures result in loss, not only on account of repair or replacement of failed transformer, but also, the revenue loss to the utility on account of power not supplied to the consumers. Other important disadvantage is reduced reliability of the system, because of frequent failure of power supply. To improve the reliability of the system and to reduce the risk of failure, it is important to bring down the failure rates. This requires a systematic study of distribution transformer failures which further needs a real time data collection for failure of distribution transformer from the field.

This project aims at the reasons of transformer failure in distribution system so that in future these problems may be avoided to save the distribution transformers failure and huge money loss of the Distribution companies along with improvement in quality and reliability of the distribution system. The report is presented in three main sections, namely introduction, basic components of a Transformer, overload, over heat or reduction oil level in conservator Remedial measures and conclusion.

II.   METHODOLOGY
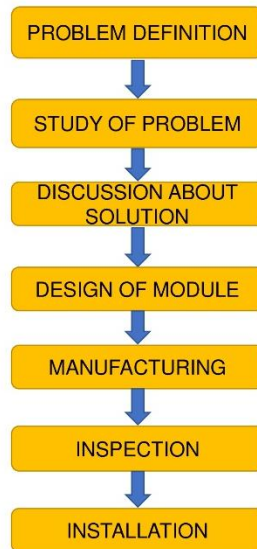
III.   MODELING AND ANALYSIS
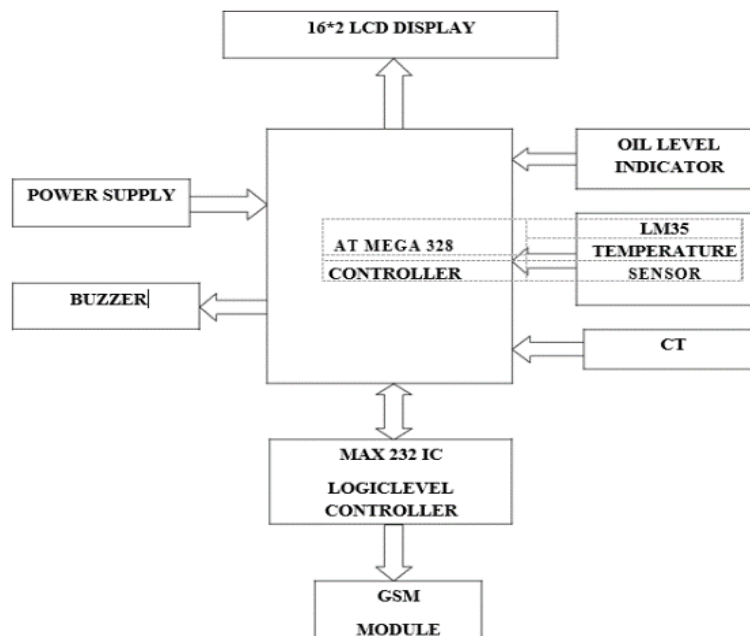
Figure 1: Block Diagram

Fig shows the block diagram of GSM based distribution transformer monitoring. Transformer used to step down the voltage level. For the different components 5V/12V dc supply required for this converter, filter capacitor, regulator is used. The At MEGA 238 Microcontroller is connected to the different input components. It 8-bit data processing, 32KB internal flash memory, 1kb EEPROM. For connecting sending end and receiving purpose GSM is used and it is interconnection between mobile telephone technology to provide data link to remote network. It is the mobile phone which consists of the transceiver, the display and the processor and is controlled by a SIM card operating over the network. CT component is used for the measuring alternating current flow through primary winding. Secondary current produced proportional to its primary winding. The current flowing through secondary in analog which is covert using bridge rectifier and filter capacitor. This output is connected to the analog port of the microcontroller. LM 35 is a temperature scensing device. which scense the temp pef oil in transformer and passed to controller. Analog output voltage proportional to the temperature. Oil level indicator indicate oil level inside the container When the is at low position then indicate

oil below normal show in LCD display and at the is above position then normal level of oil. LCD is used to display actual reading the temperature level, CT current and oil level. When temp is below normal condition this display on the LCD. Buzzer is a audio signaling device. If any abnormal condition occurs than its give signal in the from of sound for indicating purpose.
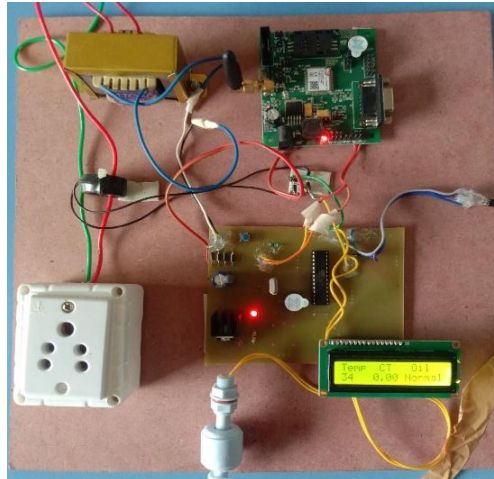
IV. RESULTS AND DISCUSSION

Figure 2: Project hardware

At normal condition when transformer is works with its ambient temperature then the display unit. shows normal temperature reading as shown in above figure 2. When load on transformer is normal then the CT shows the respected load current reading on the display unit as shown in above figure 2. when oil level in the conservator tank is sufficient to provide better cooling then the display unit shows normal oil level as shown in above figure 2.

At the first abnormal condition if the temperature exceeds 38°C then it will shows over temperature as shown in the above figure A. It will also send a message to the maintenance staff that "Temperature cross the limit please checks your cooling system" and the system will ring a loud buzzer. Hence it will be easy for maintenance staff to have continuous surveillance over the transformer. At the second abnormal condition if the current exceeds 90mA then it will shows over current as shown in the above figure B. It will also send a message to the maintenance staff that "Current cross the limit please checks your system" and the system will ring a loud buzzer. At the third abnormal condition if the oil level in the conservator tank comes below normal level as shown in the above figure 5. It will also send a message to the maintenance staff that "Oil level below normal" and the system will ring a loud buzzer.
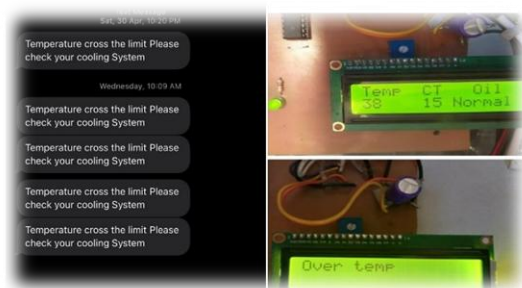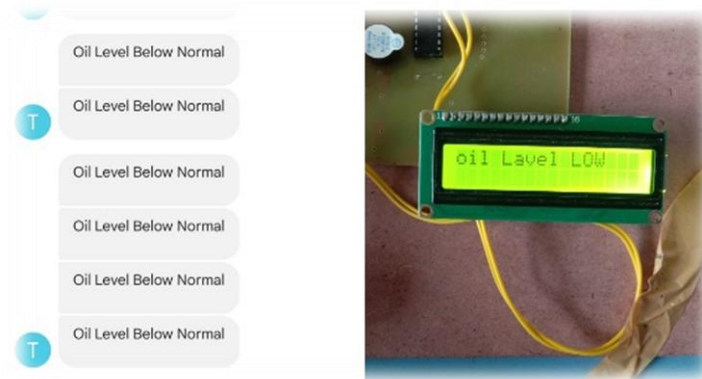

Figure A over temperature

Figure B over current

Figure C At low oil level

V.   CONCLUSION

GSM based monitoring of transformer health is quite useful as compared to manual monitoring and also it is reliable as it is not possible to monitor always the oil level, ambient temperature rise, load current manually. After receiving of message of any abnormality we can take action immediately to prevent any major failures of transformer. If load current increased the system will trip and for lower values of current the system works normally, this information conveyed to operator and if any problem arises during this monitoring process then sending SMS through the GSM network

VI.   REFERENCES

[1]   Rashmi Ashok Panherkar Prajakta Vaidya Department Of Electrical Engineering, G.H. Raisoni College Of Engineering, RTMNU University of Nagpur, India. Issue :23 November 2017

[2]   Bhakre Govind A., Dabe Nilesh P., UG Students Electrical Engineering, ATCFOE, Ahmednagar, Maharashtra, India. Pawar S.D. Professor, Electrical Engineering, Ahmednagar, Maharashtra, India. Issue: March 2017