Transformer Parameter Measurement and Protection by using Wireless System

SANDHYA. S. MESHRAM[1], RUPALI.P.GONNADE[1], RUCHI. R. CHOUHAN[1], PROF R. S. SURJUSE[1]

[1,2,3]Student B.E (Appearing), Department of Electronics and Telecommunication Engg, Government College of Engineering, Chandrapur, Maharashtra, India.
[4]Assistance Professor, Department of Electrical Engineering, Government College of Engineering, Chandrapur, Maharashtra, India.

ABSTRACT *:- This project is pointed which used for various transformer parameters measurement by using wireless mechanism, which has incorporated step-down transformer with parameter like voltage, frequency and some measurement circuit for calculating the transformer parameter. This project achieve to observe the various criteria's i.e voltage, frequency, temperature, oil level and preserve the transformer extra voltage and overburden and we used the GSM for transmitting data through wireless channel*

KEY WORD: *Step down transformer, various parameter like voltage, frequency, temperature, oil level*

1] INTRODUCTION

The 230v main supply is step down into 12v ac using step down transformer and output is inclined to frequency and voltage parameter for measurement at last this measuring data is supplies to microcontroller for further process. This all attributes are transmitte using GSM module. Here we actuate 8051 microcontroller type P89V51RD2 for used of NxP which manage entire system. With the specification 3 Timers, 2 external interrupts, 1k RAM, 64k Flash memory. 1 UART, SIP simulation support. The microcontroller is programmed by using KEIL and IDE software's and using Embedded C the coding will done. GSM mobile is required to receives the SMS from GSM module.

2] PROBLEM RECOVERY

By doing this project any fault occur during transmission in transformer can be measured and protected. By the help of wireless guided system which is based on microcontroller. In this project the over voltage, temperature and overburden are guided in single system.

3] LITERATURE SURVEY

The aim of project is TLM which is Transformer Load Monitoring for reducing cost, enhancing the efficiency and improve account to customer. Metropolitan Electricity Authority (MEA) created this project in Thailand. The objective was to built a medium voltage distribution transformer monitoring. These type of transformer are installed on roadside electric pole in Bangkok. An advanced distribution load monitoring system of transformer have capacity of measuring voltage, current and power.

4] OBJECTIVE

The main objective of this project is to Distribute different parameters of transformer to monitor and protection. We used GSM module for monitoring and protecting the transformer parameter. architecture P89V51RD2 based on 8051 microcontroller from NxP is used to perform this project.

- **The main Objectives of this project is,**

  - Voltage Measurement.
  - Frequency Measurements.
  - Thermal Measurements.
  - Oil Level Measurements.
  - Overburden Protection

5] COMPONENTS REQUIRED

- Microcontroller 8051
- Timer
- Transformer
- LCD Display
- GSM
- LM-317 Adjustable regulator
- RELAY
- ADC
- Sensors

6] COMPONENTS DESCRIPTION

A) Microcontroller (8051)

The microcontroller is central part of our project. We have tendency to used 8051 microcontroller here that is 8-bit microcontroller with 40-pin IC. It's 4-port i.e port0, port1, port2, port3 every port is of 8-bit. 2 timers that is 16-bit timer with 12 MHz of clock frequency. It has 4kb ROM and 128 bytes of RAM.

B) Timer

The timer is 2byte. i.e 16-bit out of that 8-bit is employed for Timer 0 and 8-bit for Timer 1. The timer works in 2 modes i.e mode 0 and mode 1. The timer is employ to provide the clock input or to keep up the timing operation throughout device performance. Timer may be used as timer/counter operation.

C) Transformer

The transformer name itself to transfer the energy from one circuit to alternative one. The transformer created from windings that are primary and secondary winding. Whenever we have tendency to applied the voltage to primary winding it generate an emf and due to electromotive force it collected by the secondary winding and the voltage may change from one value to other one. There are two types of transformer like

- **Step-up Transformer :-** This transformer enhance the voltage in secondary winding due to more number of coil turn in secondary winding than primary winding
- **Step-down Transformer**:- This transformer reduce the voltage in secondary winding due to less number of coil turn in secondary winding than primary winding.

D) Alpha Numeric LCD Display

LCD has name itself Liquid Crystal Display means one type of display unit which is output device for any programming operation. In Alpha numeric display we are able to show the numbers or alphabets on display screen

E) GSM

GSM (Global System for Mobile Communications) one type of digital cellular network for mobile devices. This was developed by the ESTI suggested that European Telecommunications Standards Institute to grasp concerning the technologies for 2G (second generation) digital cellular networks. And 3G (third generation) developed by the 3GPP of UMTS (Universal Mobile Telecommunication Standard). Likewise 4^{th} generation for wide band networking with high speed data and so on.

F) LM-317 Adjustable Regulator

The regulator is a device which used for maintaining the various characteristics of circuit like speed, light, electricity, fluids, gases etc. There are various types of regulator

- Voltage regulator
- Pressure regulator
- Diving regulator

G) ADC

The Analog to Digital converter is a device which used to convert the Analog type of signal into Digital one. The Analog signal can be any type like audio, sound, voice etc. which can be convert this signal by using this device to binary coded or digital form

H) Sensor

The sesnsor is used to sense different parameter like voltage, frequency, temperature, oil level etc.

7] BLOCK DIAGRAM

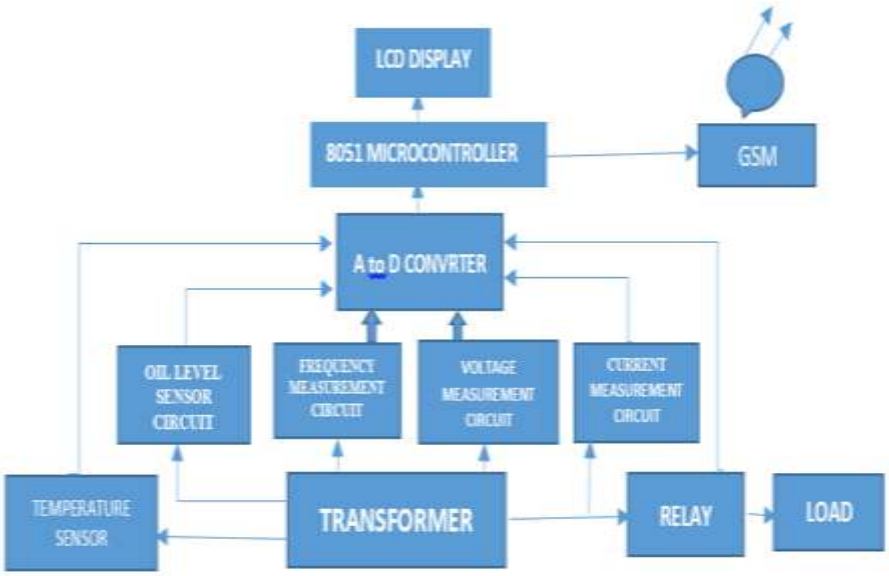

FIGURE 1 :- Block diagram of Wireless Transformer Parameter Measurement And Protection

8] FLOWCHART

FIGURE 2 :- Flowchart For Wireless Transformer Parameter Measurement and Protection

9] WORKING

We have tendency to use the microcontroller here that is heart of our project. As we know it's terribly tough to live the particular parameter values and protect them from the injury or any fault occur in it. So we used microcontroller by using this system it is easy to find the damage and correct the values of circuit if they are change without manual interference. We used the different sensors to measure or sense the different quantities of the transformer parameter and this sensing signal is then given to A to D converter for converting this analog signal into digital one. After the signal is converted into digital one then it given to microcontroller. The microcontroller start the operation of measuring the values parameter and display the signal on LCD. If the system is heathy then it will display on LCD screen and the message will be send on connected GSM module to get the information about the transformer parameter

10] SIMULATION VIEW

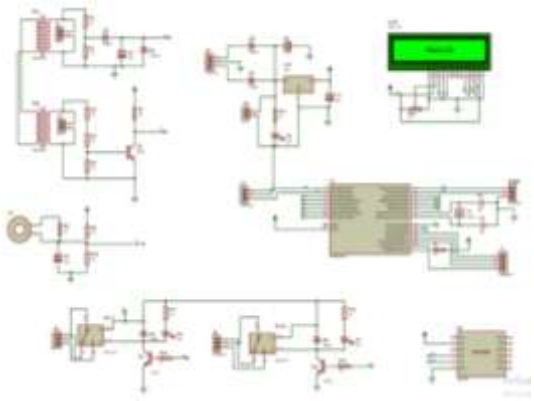

FIGURE 3:- simulation view of Wireless Transformer Parameter Measurement and Protection

11] RESULT

- As we know the project is of measuring and protecting the different transformer parameter so output of this project is to show the values of different parameter on display screen as shown in above figures. For either the system is fulty or not
- The value of parameter is changes compare to set values then the system is faulty will be display on LCD screen and message will be send to connected GSM module

FIGURE 4:- Measuring parameter of transformer on display screen

FIGURE 5:- Temprature measurement

FIGURE 6:- Current measurement

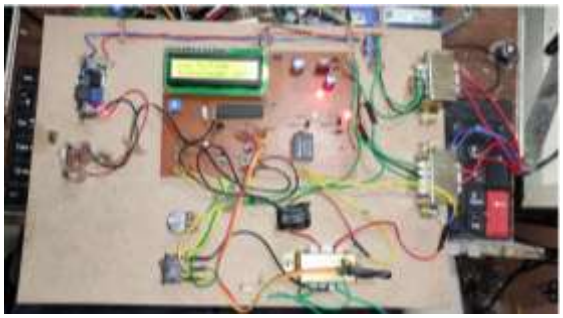

FIGURE 7:- Voltage measurement

12] APPLICATIONS AND ADVANTAGES

- Wireless transformer parameter measurement as well as protection from the damage is the main application of this project.
- If any fault is occur in the transformer then it is protected by using this project.
- It is also used in industry for different parameter measurement where the automation is needed.
- No manual interference is involve as the system is fully automated. So that the high accuracy of performance.
- It reduces the time because of automated system.

13] FUTURE SCOPE

- This is really basic circuit and has several shortcomings. As an example the system may be enforced by employing microcontroller to boost the performance of the system.
- During this project with the assistance GSM model we are going to send SMS
- Status of project are going to shown with the help of 7 segment display.
- System will created battery operated

14] CONCLUSION

By doing this project we can conclude that all the transformer parameter being measured and protected from fault using this technique. By doing this project no manual interference is needed to measure and protect the transformer parameter so it will reduce the time which take by human handling. Also the accuracy to measure and protect the transformer parameter is high because of fully automated technique. It also has many advance technique for future purpose.

15] REFERENCES

[1] "Design and Development of Low-Loss Transformer for Powering Small Implantable Medical Devices" Shiba, Morimasa, Hirano, in 2009.

[2] "A 2.4 GHz fast switchable LNA with transformer matching for wireless wake-up receivers" Tzschoppe, Kostack, Wagner, Paulo, Ellinger, IN 2014