



REVIEW ON FAULT DETECTION IN SUBSTATION BY USING GSM MODEM

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ABSTRACT: Any distribution or transmission network is prone to faults, and intermittency in power availability creates loss for the supplier as well as user. Majorly, a supply line can be effected by conditions of overvoltage and over current, also under-voltage condition. During the occurrence of any fault, the incident goes unreported for long duration. Manual reporting can lead to long outage time. To overcome this problem, a GSM based signalling system is developed that will detect the changes in voltage-current parameter, and using a microcontroller based circuit, the faults can be classified based on comparison values obtained from rated parameters of the distribution substation. To overcome these, we are proposing a GSM based transmission line fault detection System. Whenever the preset threshold is crossed, the microcontroller instantly initiates a message to be sent to the area lineman and the Control Station stating the exact pole to pole location. This helps us to realize an almost real time system. The real intention of detecting fault in real time and protecting the transformer at the earliest is realized.

Keywords: Transmission System, microcontroller, GSM Modem, Relay

I. INTRODUCTION

Generally when a fault occurs in Distribution or Transmission line, unless it is severe it is unseen. But gradually these minor faults can lead to damage of transformer. It may also initiate fire. Present day in India, we do not have a system in hand that would let us know in real time once a fault occurs. Matter of concern is that since we do not have a real time system, this leads to damage of the underlying equipment's connected and turns out to be a threat to human around.

In order to avoid such incidents to the maximum extent, maintenance or checking of the transmission lines or distribution lines are generally carried out on a frequent basis. This leads to increased manpower requirement. The fact remains that the real intention of this is not met as many a times line failure may be due to rain, toppling of trees which cannot be predicted. Like in places where massive rainfall almost sets everything standstill. It is necessary to understand the

gravity and after effects of a line failure. As a solution to these problems, a system that is working on GSM will be very useful in distribution network & transmission line which can sense the fault in the system. A microcontroller is set to compare essential line parameters with preset value stored in the monitor. Whenever the preset threshold is crossed, the microcontroller instantly initiates a message to be sent to the area lineman and the Control Station stating the value of the increased or decreased parameter, so that the type of fault and its location can be properly predicted. This helps us to realize an almost real time monitoring system.

II. HARDWARE DESCRIPTION

a) Power Supply

The main function of power supply is convert single phase supply into constant DC source by using a voltage rectifier circuit. The power supply circuit consists of following circuit components.

- Transformer:- In this project we are using 12V-0-12V. The output of the transformer is 12V AC which is connected to the diodes for rectification purposes.
- Rectifier:- It converts AC voltage signals into DC voltage signals. The output of rectifier circuit is not a pure DC sign wave signal, these signal having small amount of harmonics in it.
- Filter:- output of the rectifier containing harmonics present in the Line this is filter by the filter circuit, these circuit employs electrolytic capacitors.
- Regulator:-In this project we are using the three terminal Voltage regulators IC of 7805 is used for providing output 5V DC voltages.

b) LCD Display

Display devices are used to visually display the information we are working with. LCD (Liquid Crystal Display) screens are one of many display devices that makers use. We have

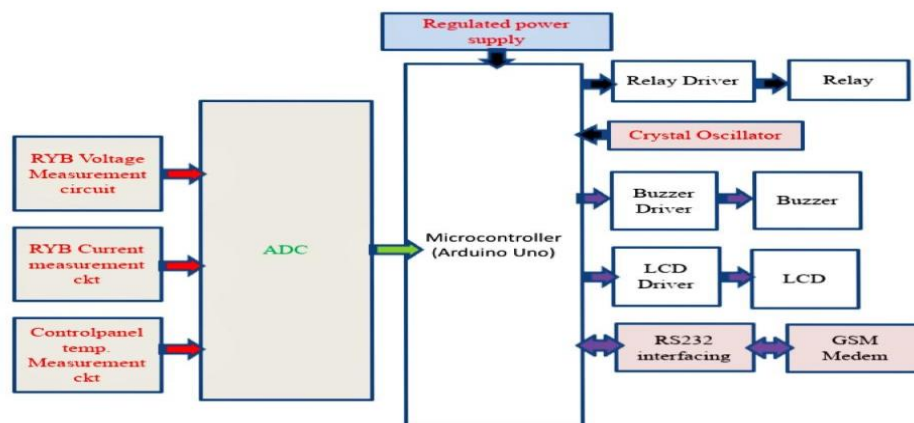


Fig.1 Block Diagram of fault detection in substation by using GSM Modem.



libraries to control specific LCD functions which make it ridiculously easy to get up and running with LCDs.

c) Arduino UNO

It is used like a microcontroller. Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output.

d) GSM modem:

SIM900A Modem is built with Dual Band GSM/GPRS based SIM900A modem from SIMCOM. It works on frequencies 900/ 1800 MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. SIM900A is an ultra compact and reliable wireless module. This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solution. SIM900A Modem is built with Dual Band GSM/GPRS based SIM900A modem from SIMCOM. It works on frequencies 900/ 1800 MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. SIM900A is an ultra compact and reliable wireless module. This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solutions.

e) Specifications:

Dual-Band 900/ 1800 MHz

GPRS multi-slot class 10/8 GPRS mobile station class B

Compliant to GSM phase 2/2+

Dimensions: 24*24*3 mm

Weight: 3.4g

Control via AT commands (GSM 07.07 ,07.05 and SIMCOM enhanced AT Commands)

Supply voltage range : 5V

Low power consumption: 1.5mA (sleep mode)

Operation temperature: -40°C to +85 °C



f) Buzzer

The buzzer is a sounding device that can convert audio signals into sound signals. It is usually powered by DC voltage. It is widely used in alarms, computers, printers and other electronic products as sound devices.

III. RESULT AND DISCUSSION:

Relays are used to operate supply to switch off all the loads in case of over Voltage or current and under voltage and current.

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