

Fault Detection in Transmission Lines Using GSM Technology

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Abstract: In this project, fault is detected using GSM module and fault location is send to a person with exact point of latitude and longitude .it will give information about the fault location through app or direct messages. In this system various equipment are used such as potential transformer Current transformer, Micro controller, GSM modem. The fault is detected and analyses automatically with help of micro controller. With help of this project, we can prevent the damages that occurs in transmission line.

Keywords - Transmission line, GSM modem, Impedance - based algorithm, Microcontroller, RS-232 Connector and Voltage Transformer fault detection.

I. INTRODUCTION

In electrical power system, more than 80% faults occur in transmission line. In this paper the design and implementation of fault detection, classification and protection technique of transmission line are present. Most of the current and voltage signal distortions are caused due to faults. Faults can lead to cause an interruption in power supply which can damage our devices. Time need to locate a fault is dreadfully decreased, as the system automatically gives exact fault location information with help of microcontroller.

When an electrical network, machines and equipment's are in operating condition, they suffered by a different types of faults. Whenever the faults occur, the characteristic values of the transmission line may get change from real existing values to another values, until the networks such as lightning, wind, storm, tree falling on line, apparatus failure etc. In our proposed system, the phase voltages and phase current sense by CT & PT and these sensing values are continuously send to the microcontroller.

II. FAULT

In electrical system, a fault is an error occurs in transmission line that leads to effect the system which can be due to fluctuation in voltage or due to damage in equipment.

III. TYPES OF TRANSMISSION LINE FAULTS:

a. **Symmetrical faults** - It is also known as balanced faults .these are of two types :

1. Line to line to line to ground and

2. Line to line to line 2 to 5 % of system faults in electrical system are symmetrical faults. When these faults occur in electrical system then it can lead to damage the equipment's of electrical power system.

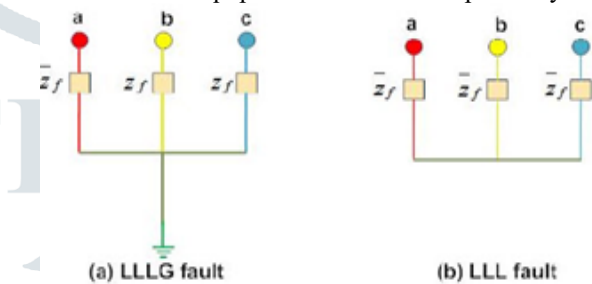


Figure: 1

b. **Unsymmetrical faults** - These types of faults are common and is less inflexible than the symmetrical faults. These are of 3 types 1) line to ground 2) line to line 3) double line to ground faults. The most common fault is line to ground fault. 65 to 70 % of faults are of unsymmetrical type faults.

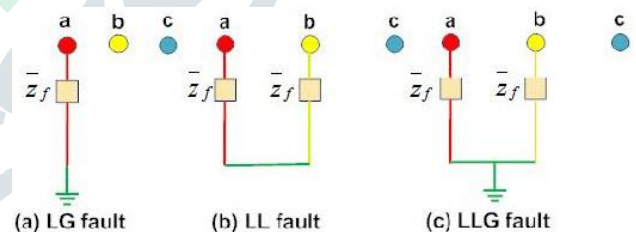


Figure: 2

IV. PROBLEM STATEMENT

To decrease the period of disruption and to minimize the counter time to faults, it is imminent for companies of power transmission to find for communication devices of low cost and with low power consumption which will carry exact fault information's at actual time return to control center.

V. BLOCK DIAGRAM

The PIC microcontroller which serves as the heart of the entire system enables access to real time state of the system. It receives the perceived parameter during power transmission, detect breach in short circuit limit set by comparing the current sensed with the pre-set limit. If the

current sensed is more than the pre-set current short circuit limit, the PIC microcontroller sends a signal for the relay to trip off the system, else the system remains connected. When the relay trips of the system, an SMS alert is sent to the utility mobile phone via the GSM network.

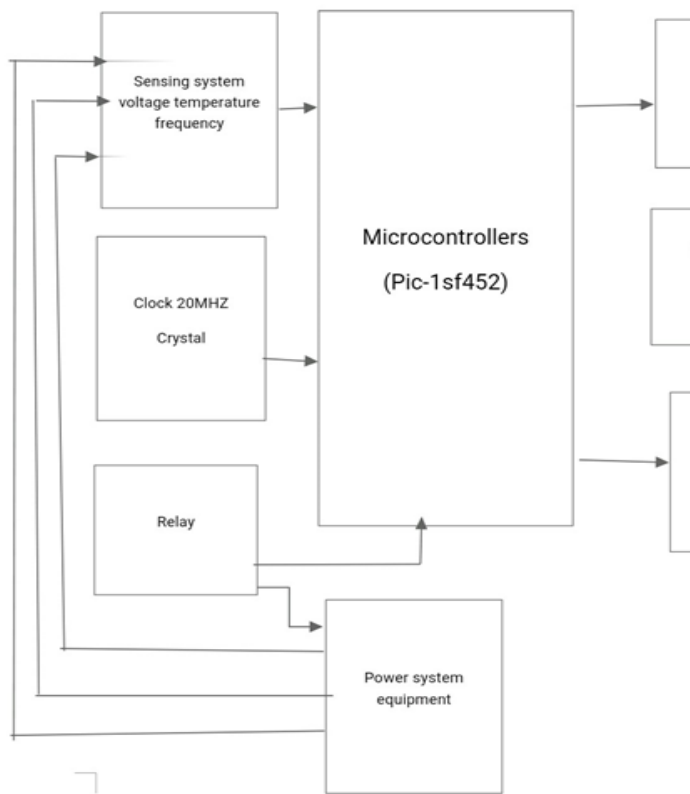


Figure: 3

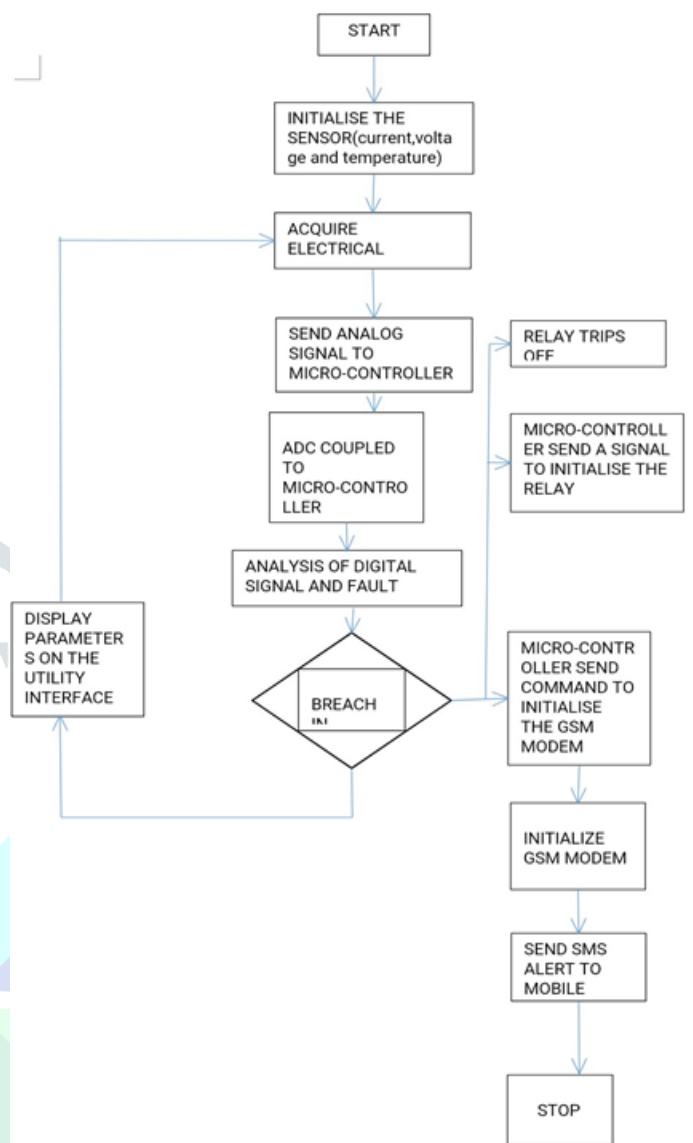


Figure: 4

VI. THE COMMUNICATION SYSTEM

The GSM modem (global system for mobile) is a special type of which accepts a sim card .GSM modem is connected to computer with help of which it communicate over mobile networks. GSM modem devices is for both sending and receiving SMS and MMS messages. Whenever the set threshold is bridged, the system sends an instant message to the utility mobile phone, stating the existing fault and the location using the GSM modem.

a. Operation of the GSM

GSM Modems are controlled by the microcontroller using the (AT) commands. However the GSM modem supports a fixed and protected set of (AT) commands

- Send SMS messages.
- Reading, writing and searching phone contacts.
- Monitor signal strength.
- Read, write and delete SMS messages

b. The Sensing Unit

The sensing unit subsist of the sensing current, the sensing voltage, the sensing frequency and the sensing temperature, as it helps to acquire electrical parameter and make the respective signals available for the PIC to process.

VII. ADVANTAGE

1. This system gives the exact information about which type of fault occurred in the line such as L-G, L-L etc.
2. We can easily monitor the transmission system from the any corner of the world because of the GSM system that gives real time status of the system.
3. This system is more flexible than the existing system which can easily overcome the time required for finding the fault in any environmental condition.
4. We can easily mount the system on pole, because of its small size, light weight.

VIII. FUTURE SCOPE

The purpose of this paper is that to send a quick message to the service provider authority as fast as possible if there is a fault in transmission line. In this project, we detect the location of faults with the help of GSM. We can have a global positioning system (GPS) connected to it so it will send accurate location (latitude and longitude) of fault occur in transmission line. In future we can use appropriate programming for finding distance of fault from substation.

IX. RESULT

The analysis of fault detection and location system of transmission line. Whether it is any type of fault that can be detected and located. When fault get occurs on the transmission line the signal is send to the control room or mobile phone through a GSM modem. The message receive on the mobile that is the fault between pole 1 and 2 and the fault which is symmetrical or unsymmetrical. The signal that appears on the control room or mobile phone is the L*G or any other type of fault occurred on transmission line.

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