

# DETECTION OF FAULT OF UNDERGROUND CABLE BY USING CT AND PT

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**Abstract**—This paper is to determine the distance of underground cable fault from the base station in meters. An underground cable system is quite common in many urban areas where in it becomes very difficult to repair in case of any faults because finding the exact location of the fault in such cable system is quite difficult with the proposed system, finding the exact location of the fault is possible. In this paper we use the current transformer and voltage transformer for getting the status of line which is then fed to an ADC, to develop a precise digital data that gets displayed on the LCD interfaced to the microcontroller. Furthermore, this paper can be enhanced by using a capacitor in an AC circuit to measure the impedance which can even locate an open-circuited cable, unlike short-circuited fault.

**Keywords**—Microcontroller, Current transformer, Potential transformer, LCD, Converter circuit.

## I. INTRODUCTION

Study of cable failures and development of accurate fault detection and location methods has been interesting yet challenging research topics in the past and present. Fault detection entails determination of the presence of a fault, while fault location includes the determination of the physical location of the fault. Accurate permanent fault detection techniques and relatively accurate fault location methods have been developed for overhead distribution systems. However, fault detection and location technology for underground distribution systems is still in developing stages.

This project consists a current transformer and potential transformer for sensing the current and voltage values. One PIC microcontroller is used for comparing this sensed values with the values which are inserted in the program of microcontroller. From this comparison, if the current value is increased above certain limit and voltage goes down below the certain limit then controller shows the short circuit fault on the display. If the voltage value is increased above certain limit and current goes down below the certain limit then controller shows the open circuit fault on the display.

## II. BLOCKDIAGRAM

The fig.1 shows the block diagram of "Underground cable fault detection and location". This design contains microcontroller, current transformer, potential transformer and LCD display. These both transformers work as current and voltage sensing devices. Microcontroller circuit is capable of detecting and locating the fault with the help of sensors output and the program inserted in the microcontroller. The LCD display is used to display the type of fault and the fault location.

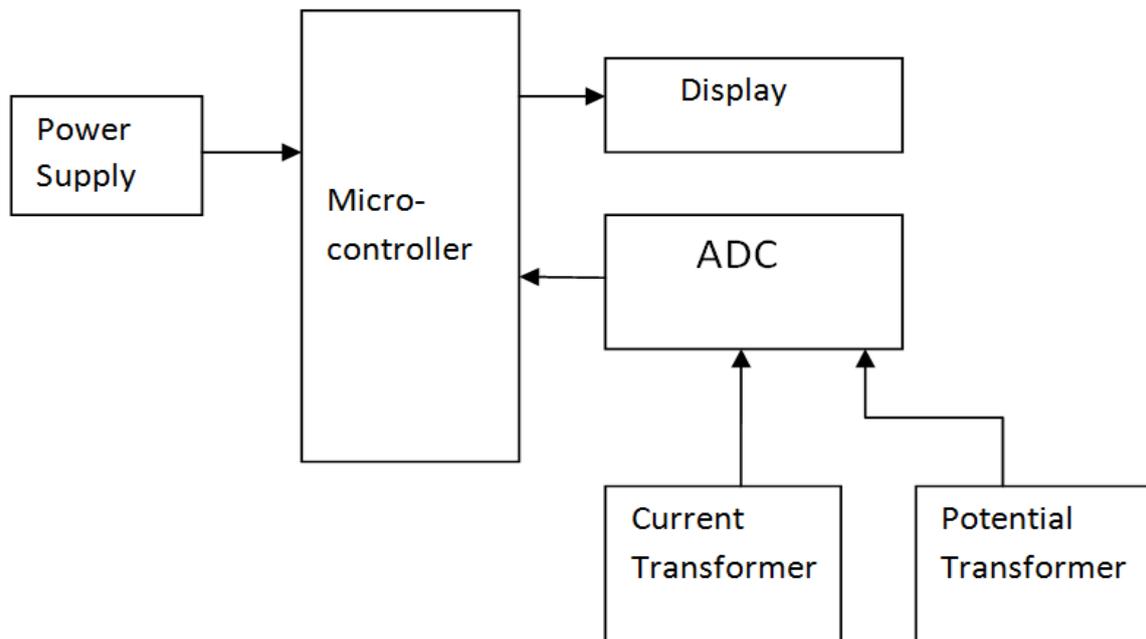


Fig. 1 Block diagram of determination of fault of underground cable

### III. PRINCIPLE OF OPERATION

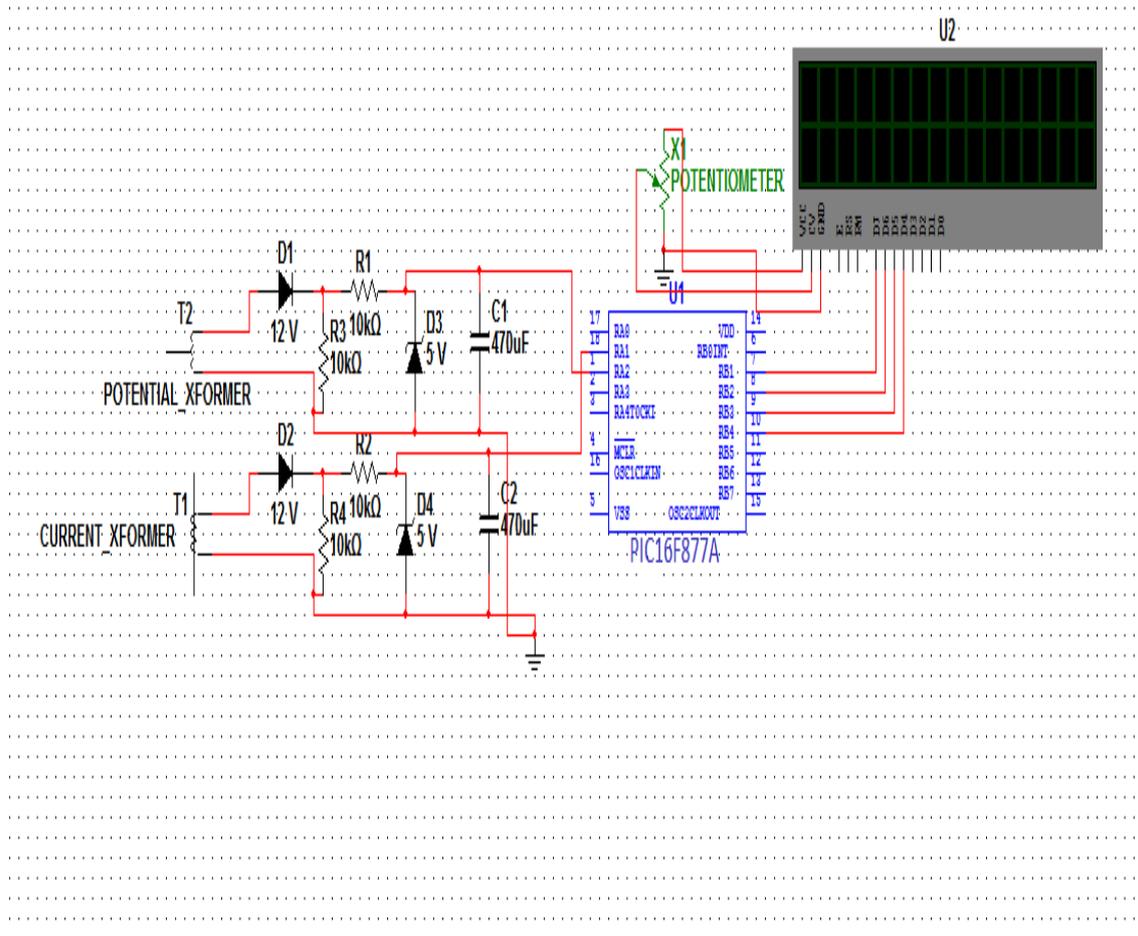
This project is to determine the distance of underground cable fault detection from base station in km. The underground cable system is common practice followed in many urban areas. While a fault occurs for some reason, at that time the repairing process related to that particular system is to find the exact location of fault.

The current transformer and potential transformer are used to get the current and voltage values of the underground cable. These values are then given to the ADC which converts the analog quantities of the transformer output into the digital quantities. Now these digital values of voltage and current are given to the microcontroller.

In case of short circuit the current in the line increases above the rated which will be shown by the current transformer. Also in case of open circuit the current becomes almost zero and only voltage remains in the line; this will be shown by both the current transformer and voltage transformer. This change in value is sensed by the microcontroller and it will display on the screen.

### IV. CIRCUIT DIAGRAM

In this circuit diagram the output of the potential transformer and current transformer is given to the converter circuits. In the converter circuit of the potential transformer, a voltage divider is used for converting the voltage. This voltage is again filtered out and the output is given to the microcontroller.



#### V. EASEOFUSE:

- This small scale project can be implemented in any underground cable system.
- This helps in finding faults in very short time with very low cost.
- Underground cable system of college.
- Industrial areas.
- Malls.

#### VI. CONCLUSION:

In this project, a methodology for underground cable fault locator was developed. The device can detect underground cable faults such as short circuit and open circuit and also indicates a correct cable when the cable is normal. Also the method used for finding the fault is very cheap and suitable for any system. This takes very less time for finding the fault hence used for many places.

#### REFERENCES

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