Underground Cable Fault Detection Using ARDUINO, GSM, GPS

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ABSTRACT: As in Power system Generation it is to implement the more long cable which is we are used as underground cable. There is a chance to occur fault in the underground when we used it to distribute in the urban areas on that time it is difficult to find the fault in the underground cable. So that we are using the arduino microprocessor, GPS and GSM modem to find the fault easily and accurate. The aim of this paper is to detect the fault and to determine the exact distance of underground cable fault from a substation in kilometers.

KEYWORDS: IOT, Underground Cable, Microcontroller AT mega, LCD Module, GPS Module, Relay Drive

I.INTRODUCTION

In a electrical utilities, some of the transmission lines plays the major role of every power systems. With regard to this, cost of power delivery, and accurate fault location for the transmission of electric lines is of vital importance in restoring the power services and reducing outage time as much as possible. By an accurate source detecting and finding the exact faults on high voltage transmission network is very important for all the utilities to allow a quick maintenance action for the concern authority of a repairing person or crew. Detecting the cable fault in the underground can be categorized as aOpen conductor faults, shorted faults, and high impedance faults. Which it may occur in the transmissionlines.

This we can able to do using the arduino microcontroller to monitor the cable in the underground with the use of loaded program in the microcontroller. A short circuit to the earth fault can be mostly located using a method called frame method. The fault occurring in the underground may be due to the short circuit to another conductor in the cable, short circuit to the earth, high resistant to earth, open circuit and some of the machine digger can also able to fault the underground cable in the transmission lines.

II. WORKING OFCOMPONENTS

In this we are using the 12V power supply to give the current supply to the circuit kit and to power up the arduino microcontroller to control the circuit. The power4 supply circuit consists of a step down transformer which is 230v step down to 12v.And through this microcontroller all the components like LCD display, current sensor, relay switches, a bulb, GSM and GPS module is connected which may it also uses to power up individually.
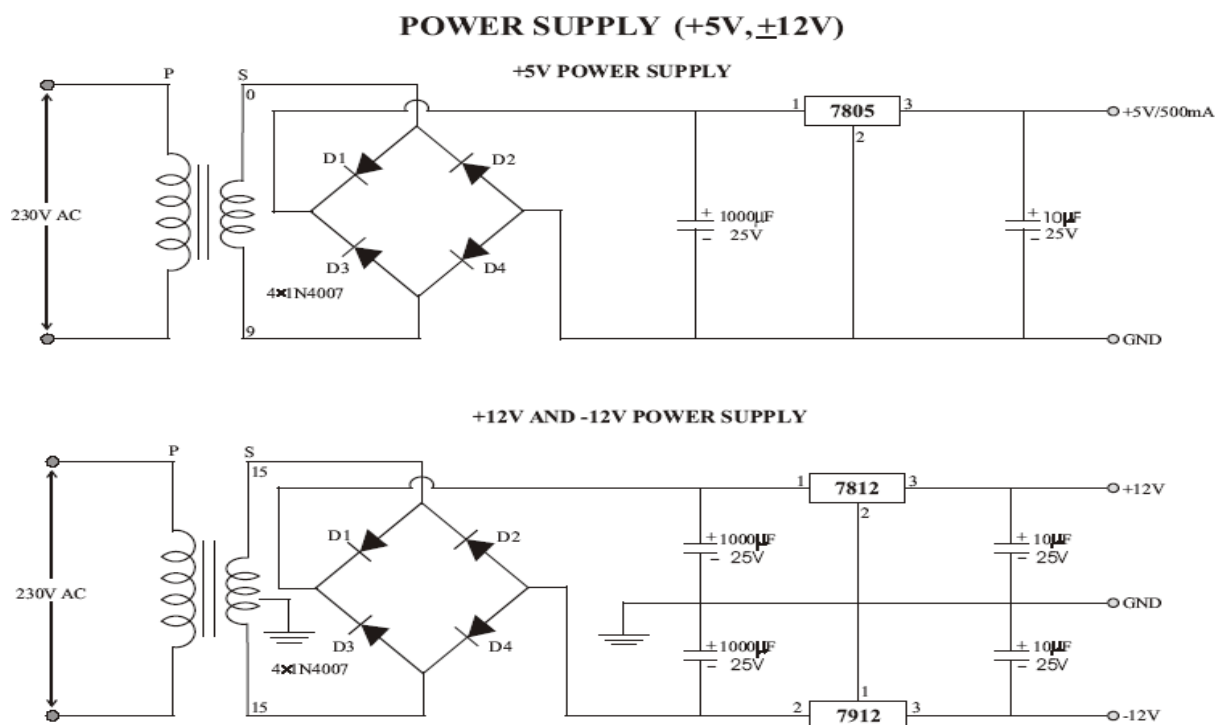
Figure 2.1. Power supply

And here we have three relays which it is representing the three cables in the underground. The first and second relay contains no fault in this circuit as we programmed into the microcontroller. Only the third microcontroller contains fault in this circuit as we programmed in the microcontroller. As soon as we press the relay switch of the third relay its starts blow with the bulb of which it contains the direct power supply from the electricity. The third relay is connected with the CT called current sensor of range 5Amps which is used to sense the current in the cable which is under fault occurrence of the electric cable. After the fault occurred in the cable the CT senses its fault and immediately sends a message to the authorized person through the message is send by SIM800, it is a complete GSM/GPRS solution in a this type, which can be embedded in the customer applications.IN this type SIM 800 supports a circuit with a microcontroller to access it, and it can transmit Voice, SMS and data information with low power consumption. With a small size of 17.6*15.7*2.3mm, it can smoothly fit into slim and compact demands of customer design. This data would be received and displayed in theLCD.

III. FUNCTIONAL DISCRIPTION

As in this circuit kit we can able to detect only the location of short circuit fault, by detecting the location of open circuit fault in the underground cable and to detect the open circuit fault capacitor is used in the AC circuit which it can measure the changes in impedance and calculate the distance fault locator easily by themicrocontroller. And by the use of GSM and GPS the message will be send immediately to the authorized person in the power station hub. And what is the range occur in the fault cable like energy transmission, voltage and current values will be displayed in the LCD display. The three relays which is placed in the circuit is mentioning the cables. The voltage regulator is attached with the circuit which to supply the 5V and the 12V power supply. So that the voltage regulators of 7805 and 7812 voltage regulators areused.
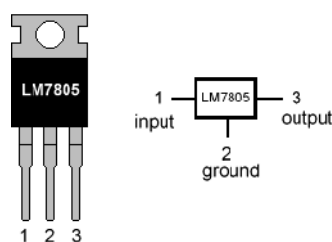
Figure 3.1. Voltage Regulator

GSM Modem works on the frequencies of gsm 900 MHz and pcs 1900 MHz. In this GSM sim300 features GPRS multi slot .This GSM is highly flexible plug and use AC – DC power adaptor with DC voltage of 12V.

IV. RESULTS AND DISCUSSIONS

GPS .

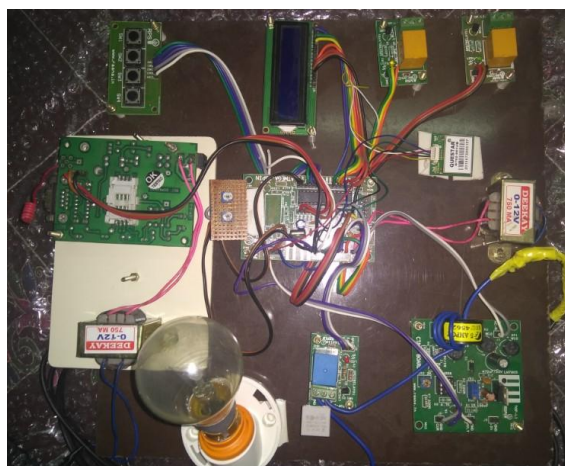This is the kit which is used to detect the underground cable fault using the arduino microcontroller, GSM and

Figure 4.1.Underground cable fault detector and distance locator using arduino, GSM, GPS

V. CONCLUSION

This objective of the paper is to determine the fault occur in the underground cable and to detect the exact location of the fault from the power station. Using the microcontroller we can be able to find the distance. This paper proposes a fault location in the underground cable. The aim of this paper is to determine the exact location of fault which occur in the cable. When any fault like short circuit, voltage drop and some other current varies as soon this kit is used to find its fault and give a message through the GSM module and the exact location through GPS and also which will be displayed in the LCDdisplay.

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