

OVERCURRENT AND OVERVOLTAGE PROTECTION USING GSM

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Abstract: In this paper we aim to design a system which is capable of detecting overvoltage and overcurrent in system and automatically shuts it down. In addition to this, the whole mechanism is controlled by GSM i.e., user can send instruction to power on or off the system and can also receive message if an overvoltage and overcurrent condition occurs.

I. INTRODUCTION

Protection of line is very important for a secure and balanced system. Power system fault is an undesirable condition in power system like short circuit, over voltage, over current and etc. It occurs mostly due to increasing of voltage level or increasing load. This fault can result in permanent damage, which is highly undesirable. In this paper we are presenting over voltage and over current protection system using GSM. GSM controlled system connected with programmable 8051 microcontroller for protection. A protective relay is connected to ON and OFF the circuit with GSM. In case of over voltage or over current, protective circuit operates and OFF the main circuit, and send the message of being OFF to user.

II. THEORITICAL BACKGROUND

A. Overcurrent

In an electric power system, overcurrent is the current larger than intended electric current exists through a conductor, leading to excessive generation of heat, and the risk of fire or damage to equipment. Possible causes for overcurrent include short circuits, excessive load, incorrect design, or a ground fault. Fuses, circuit breakers, temperature sensors and current limiters are commonly used protection mechanisms to control the risks of overcurrent.

B. Overvoltage

When the voltage in a circuit or part of it is raised above its certain limit, this is known as overvoltage. The conditions may be hazardous. Depending on its duration, the overvoltage event can be transient—a voltage—or permanent, leading to a power surge.

C. Protection relay

In a protection relay, secondary of current transformer is connected to the current coil of relay. And secondary of voltage transformer is connected to the voltage coil of the relay. Whenever any fault occurs in the feeder circuit, proportionate secondary current of the CT will flow through the current coil of the relay due to which mmf of that coil is increased. This increased mmf is sufficient to mechanically close the normally open contact of the relay. This relay contact actually closes and completes the DC trip coil circuit and hence the trip coil is energized. The mmf of the trip coil initiates the mechanical movement of the tripping mechanism

of the circuit breaker and ultimately the circuit breaker is tripped to isolate the fault.

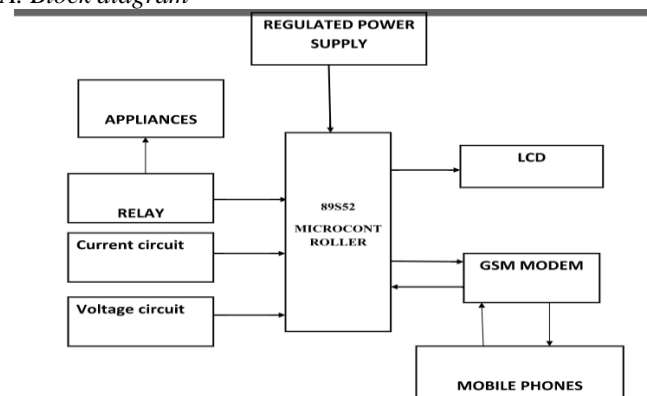
D. Why Protection System Is Important

Fault impose hazard to both user and the system itself and when it comes to user, life is the concern and when it concern the system it is merely to provide stable electrical power system on top of that prevent damage to the expensive equipment used.

III. PROPOSED FAULT MANAGEMENT SYSTEM

An " Over Current over voltage protection " is a type of protective circuit which operates when the load current or load voltage exceeds a preset value , So that the crucial , heavy & sensitive load can be detached as soon as possible for this application Relay is used, relay act as switch to isolate the load. Current transformer calibrated with the current circuit to operate at a specific current level .here along with current transformer Relay is used with 8051 microcontroller. The 8051 micro controller will cause the circuit breaker to trip when the current from load current is more than the threshold value in op-amp. The op-amp used here is the LM358 comparator.

A. Block diagram



B. Proposed Procedure of Project

- 1) To measure and analyze load current from current sensor
The load current will be measured by using the current sensor. This load current is converted to ac voltage by using the current circuit, after this it converted to digital voltage by using at 89s52. This load current will be display on the LCD.
- 2) Trip circuit breaker using 8051 microcontroller
With the help of 8051 microcontroller, the D.C voltage is match with the threshold preset value of the op-amp after that if voltage is greater than threshold voltage , then circuit breaker get energized and activated.
- 3) Develop algorithm for instantaneous over current relay and IDMT relay

The over current setting may be given by definite time or inverse definite minimum time (IDMT) characteristic. there are four curves for over current complying with IEC 255 and are named 'Normal Inverse, 'Very Inverse', 'extremely inverse' and 'long time inverse'. This project is to develop the 'long time inverse' characteristics of IDMT.

IV. RESULT

Upon sending messages from user's SIM, the GSM modem responds and performs the set processes as instructed by user.

For e.g.:

35791 ON1 : power on the device

35791 OFF1: power off the device.

Upon detection of overvoltage or overcurrent, it shut down the circuit and sends "OVERVOLTAGE" or "OVERCURRENT" message to the user's SIM for overvoltage or overcurrent detection respectively.

V. CONCLUSION

The designed toolkit successfully receives the message and performs the required operation. It deletes the SMS once another SMS is received, in order to save up the space. However, the major constraints are use of '*' on termination of SMS and display of only one message at a time. This constraint can be removed by using higher end microcontrollers and extended RAM.

VI. ACKNOWLEDGMENT

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