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MICRO CONTROLLER BASED VOLTAGE PROTECTION SYSTEM

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ABSTRACT

This paper presents strategies for assessment and independent control ofvoltage which is finished by an automated microcontroller based security framework with thermistor. It used to really look at temperature alongside voltage insurance. The transformer utilized is copper cored and it works just on rotating current source. The thermistor is utilized to distinguish the temperature in instance of overheating or fire problems.GPS module is additionally used to mindful proprietor of the framework by sending the instant message on telephone in the event of recognition of any surprising action. Like low voltage, high voltage, high temperature.The principal challenge is to make a succession of codes for legitimate working.

KEYWORDS: *Microcontroller, Thermistor, Low Voltage, High Voltage, Arduino*

I.INTRODUCTION

The abnormality in voltage is the significant issue confronting industry also, home today and in many cases, is liable for harming important electrical gear. Electrical Power Framework assurance gadget is expected for security of both client and the framework hardware from shortcoming; thus electrical machines are not permitted to work with no defensive gadget introduced. Power Framework shortcoming is characterized as unfortunate condition that happens in the power framework and the unwanted circumstances are short out, current spillage, ground short, over current, under and over voltage.

In technical terms, an over/under voltage condition occurs when the voltage is 10% higher or lower than the nominal voltage for a duration of more than one minute. Short-duration voltage events, including both impulsive and oscillatory transients, may also transpire. Short-term intermittent supply failures can occur for a variety of reasons, including problems with the supply system, equipment malfunctions, or problems with control equipment. They can last anywhere from 0.5 cycles to 1 minute.

While overvoltage in the form of spikes and surges can result in distortion, burn-out, meltdown, fire, and irreparable damages, undervoltage can produce brownout, distortion, or permanent damage.

II.HIGH AND LOW VOLTAGE PROTECTION

Only 220 volts is sufficient for the operation of most household appliances. A 20% increase or decrease in the required voltage is likely to cause damage to the equipment.

Relays were the sole component of the early device protection techniques. They are not given access to the most recent features that are available on the market right now. In older systems, there were simply fuses, which burned at greater voltages and had to be replaced later by the user alone.Usually, the early low voltage protection circuit is unable to sense temperature and cannot alert the user to a problem.

The most recent protection system, which includes every safety feature possible, including: detecting high and low voltage without jeopardizing the fuse circuit; supplying voltage to the device only after obtaining a stable supply because it can also detect fluctuations; ¬ temperature detection using a thermistor. And all of this was completed simultaneously with immediate notification of the device's owner via text message on a GSM module-

III.COMPONENTS USED

- Microcontroller
- Transformer
- Relay
- Voltage Regulator
- Voltmeter
- Arduino
- GSM Module
- Thermistor

IV.WORKING METHODOLOGY

First, we supply the system with electricity, connecting the voltage regulator and voltmeter in parallel. Here, the circuit's voltage is controlled by the voltage regulator, allowing us to verify whether the project can actually shield any system from a high- or low-voltage source.

Since all of the processes are in DC, a step down transformer is used after the voltage regulator to ensure that the subsequent circuits operate as intended. However, we add a full wave

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bridge rectifier because the next circuit cannot be made to function simply by stepping down an AC supply. Its primary purpose is to change an AC signal into a DC signal, albeit the signal will still naturally contain ripples. Therefore, in order to minimize or neutralize it, we employ a capacitor to produce a direct signal that has the least amount of ripple.

Following the full wave bridge rectifier, all three circuit boards—which are primarily used for temperature sensor control, high voltage trip circuits, and low voltage trip circuits—are connected in parallel and subsequently to their relays, which control and safeguard the main system that is connected to this protection system.

Additionally, we connected an Arduino to a GSM module so that in the event that the system overheats, the Arduino programming can send an SMS to the cell phone provided.

V. BLOCK DIAGRAM

It is shown in fig.1

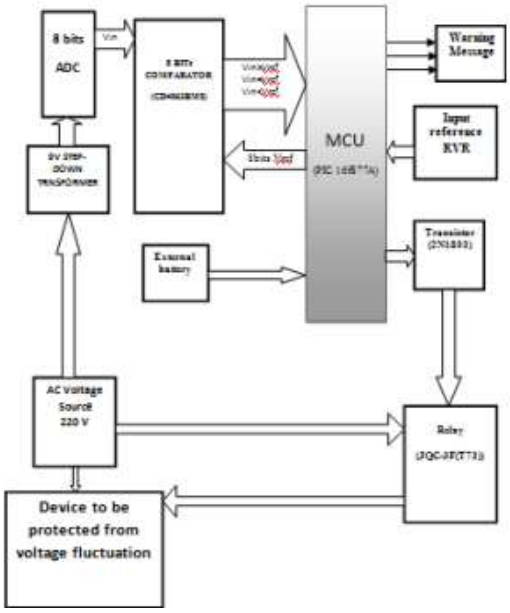

Fig.1.Block Diagram

V.RESULT

The outcome of the work that our teachers and I put into this project over the period of several months. The protection system is properly tested on various devices, taking into account the stated parameters. Various voltages were applied in order to assess its efficiency. The relays stay closed and the attached gadget functions when the supplied voltage is within the designated range. A voltmeter measures and shows the supplied voltage. Relays get activated in the event of an undesired scenario, tripping the device's supply. The outcome of the work our professors and I put into this project over the period of several months.

When the power is turned off because of overheating, low voltage, or high voltage, a notification is sent. Your system's power supply will cut off for safety reasons and re-connect when the weather stabilizes and becomes usable.

Fig.2.Hardware Photo

VI.CONCLUSION

The primary voltage supply is monitored by a microcontroller-circuit, which is intended to cut it off if it drops or rises outside of the specified voltage range (RVR). In the event that the voltage is disconnected, the microcontroller circuit will continue to monitor it and will only reconnect it when it stabilizes and complies with the RVR. The project's design worked well. The design is appropriate for both residential and commercial use, considering the global variations in main voltage supply, particularly in the summer and during extreme weather conditions and subsequent power outages. Equipment linked to the main supply that is electrical and electronic can become damaged as a result of voltage fluctuations. This project uses a 215–230 volt RVR range as the typical voltage boundary; the design suggests using a keypad to input the RVR manually. The benefit of Keypad is that it allows you to select any voltage range (110 V supply, for example). More and more value gadgets will be provided by the embedded system approach, which is based on microcontrollers and is an intelligent system that may be used for voltage monitoring to protect office or home electric equipment.

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