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THREE PHASE TRANSMISSION LINE FAULT DETECTION AND ANALYSIS SYSTEM

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ABSTRACT

Electricity has become the most sought-after amenity for all of us. Gone are the days when Electricity would be only limited to cities. It is now reaching every distant part of the world. So, we have new a complex network of power systems. This power is being carried by the Transmission lines. These lines travel very long distances so while carrying power, a fault occurring Is natural. These faults damage many vital electrical types of equipment like a transformer, generator, and Transmission lines. For the uninterrupted power supply, we need to prevent these faults as much as possible. So, we need to detect faults within the shortest possible time. Microprocessor and microcontroller-based systems used for this fault detection have been advancing rapidly. The simulates a Numerical Over current relay that detects faults using a Microcontroller and ADC. These relays are more reliable and have a faster response than the traditional electromechanical relays and Static relays. They have an increased range of settings, high accuracy. Reduced size, and lower costs, along with many other functions, such as fault event Resetting.

This project is about designing the Numeral relay upon where the fault is detected when the input value exceeds the reference value set in the relay which then gives the trig signal to the Circuit Breaker.

1.INTRODUCTION

The object of this paper is to determine the segment of transmission line fault from a base station. The transmission system is a common practice followed in many urban areas. While a fault occurs for some reason, at that time the repairing process related to that particular called is difficult due to not knowing each location of the called fault. The proposed system is to find each segment of the fault.

To improve the reliability of a distribution system, accurate identification of a faulted segment is required to reduce the interruption time during fault.i.e.to restore services by determining a fault segment on time. In the convenient way of detecting a fault. an exhaustive search in large-scale distance Has been conducted. This is time-consuming and inefficient Not only that the manpower resources are not utilized, but also the Restoration time may vary depending on the reliability of the outage information. As such, deriving an efficient technique to location a fault can improve system reliability.

2.BACKGROUND AND LITERATURE AND DESCRIPTION

Here we will discuss the importance of carrying out this project. We will also discuss different components used in our project.

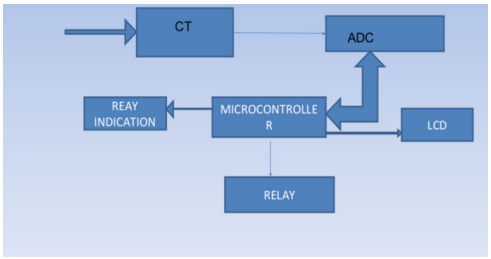
NEED FOR PROTECTION
Fault introduces danger to both electrical apparent and people. Therefore, we have to Protect ourselves as well as the types of equipment from these faults. Without it, the power system will fail in No time. Various issues that need to be protected are:
• Safety far People
• Equipment safety: Keeping pieces of equipment safe from various electrical abnormal and faulty Conditions.
• Power system stability: Maintaining a continuous and reliable power supply.

OVERCURRENT RELAY: Defined as any current which is more than the rated current rating if the equipment or a conductor. This may be caused by overland, short circuit, or ground faulty. When current Flaws through a conductor it produces heat. So at faulty conditions large current results in Overheating which my damage types of the equipment The current from the transmission lines goes to the Over current relay upon through the current The transformer in the form of AC. In normal conditions relay on remains in the power state and the lased state in an over-current fault situation. Multiplier and Plug Setting Multiplier. The time setting multiplier adjusts the traveling distance if moving contact that is one of the cause the time delays if they relay upon when a faulty occurs. Another cause is the speed of moving which depends upon the level of fault current. The pickup current value is decided by the plug setting multiplier.

3.METHODOLOGY

Here we will be explaining the while steps followed in the operational of the relay. We will also, be explaining the algorithm followed in finding but the RMS value if the current to sum up we have posted the flowchart of the operational of the whole project and a picture taken of our hardware model.
WORK DONE AND STRUCTURAL ANALYSIS
We are doing the model with 5V supply conditions means all the devices i.e., LCD are working an a 5V supply. We have given also 5V as the voltage reference to the ADC. We have fed a continuous analog sinusoidal voltage signal to the ADC channel number 0 by selecting the values if A=0, B=0, C=0. We have given clock converting Frequency to ADC 0808 as 691. 1875 kHz with the help of two D Flip-Flop IC 74LS74 each Containing Two D Flip-Flop. ADC performs sampling, quantization, and encoding of the analog Signal thus producing digital binary data. This binary output digital data is obtained from the 8 output pins of the ADC. The output from the ADC is fed into posted 1 of the microcontroller. The output of the microcontroller is fed into the LCD from port 0 through an external pull-up of 8 resisters each of 10KΩ. Output from the ADC is represented as:
I = 2n x (Vin / Vref), where Vrf is the reference voltage 5V
Vin is the input voltage
n is the number of bits (here 8)

4.BLOCK DIAGRAM:



1. Analog signal (current) is obtained from the transmission line and is reduced by the current transformer.

2. Then the current signal is transformed to voltage signal by using the current sensor circuit.

3. The analog voltage signal is then converted to a digital binary signal using ADC

4. The RMS value of the current is found out and displayed on the LCD.
5. In a microcontroller to which ADC interferes, a program is written the input current value with the relay preset current value to determine the occurrence of the fault.
6. The result is then displayed on the LCD.
7. Facility to change relay preset value and definite time setting is provided if the operation invoked.

5.FUTURE SCOPE FOR MODIFICATION

We have two types of fault that come under short circuit fault- one is symmetrical and the other asymmetrical. L-G, L-L, L-L-G come under symmetrical fault and L-L-L and L-L-L-G come Under symmetrical faulty. Our steps are limited to detect a fault in a single phase if the current exceeds the Set value and provides a signal to trig. Our setup in this project can be modified to determine the Different types of fault(e.g. L-G, L-L, L-L-L, L-L-L-G) by adding two more similar setups so That we can have three phases. From these phases, we can generate the negative, positive, and zero sequence components if the fault current, and then by checking the different conditions like equality or inequality among positive, negative, zero sequence current we can determine the types of fault

6.CONCLUSION:

We have been able to incorporate successfully the detection of fault by using ADC and Microcontroller by taking both the input voltage as DC and AC Sinusoidal. It is observed that When the current value obtained from the secondary current value of the current transformer is Greater than the preset value of the relay then the fault is detected by the Microcontroller. The Result is displayed on the LCD screen. We can set different trip time delay using definite time Characteristics of the relay. By this project, it channels are ensured faster detection if faulty than the Electromechanical relay on the power lines and their advanced analysis can be studied from the Recorded data by the Microcontroller. Also, the method we followed to find but the RMS value of the current gave an error of about 1. 8-2. 3 % if the actual calculated RMS value

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