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Phase Failure Detector and Protection of a Submersible Motor

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ABSTRACT: The 3 phase transmission lines are the souls of power system, fault in the transmission lineis common and major problem. The main aimof this project is to detect, indicate and protectthe 3-phase submersible motor from various faults. This circuit is to prevent overload, dryrun fault conditions like voltage or current variation in any phase of three phase ac supply. Generally there are two types of faultsthat occur in AC motor i.e. mechanical fault and electrical fault. Mechanical fault occur due to bearing jam and electrical fault occur due to over voltage, over current, over temperature, under voltage, dry running etc. This project deals with governance marshal circuit to monitor and control the submersiblemotor for agriculture purpose.

I.INTRODUCTION

India being an agriculture country most of itsresources depend on agriculture products. In some areas where rainfall is insufficient its important to use bore well water wisely. In anelectric power system, a fault is abnormal flow of electric current. In this case when there is any fault in 3 phase transmission line the motor will get damaged. To repair that motor which costs more to over come this problem we are developing a circuit .When any one of the phase get faulted this circuit detect and analyze in which phase fault has occurred, and it generates the voltage for the faulted phase, then it provides continuous 3 phase voltage to motor.

II. OBJECTIVE OF THE PROJECT

The objective of this project is to design a protecting circuit, which will analyze the fault in the transmission line and provide protection to the submersible motor used in agriculture.
Protection and control of submersible motor in any one phase failure in transmission line.The major reasons for phase failure are as fallows
(i) Over heated or loose connection in one phase
(ii) Due to unbalance voltage source and phase sequence (iii)Rapid change over in supply To satisfy this demand by designing the circuit, to detect any one phase failure in the transmission line after that it generate the voltage for faulted phase, proper working andprotection of 3phase submersible motor fromdamage will done.

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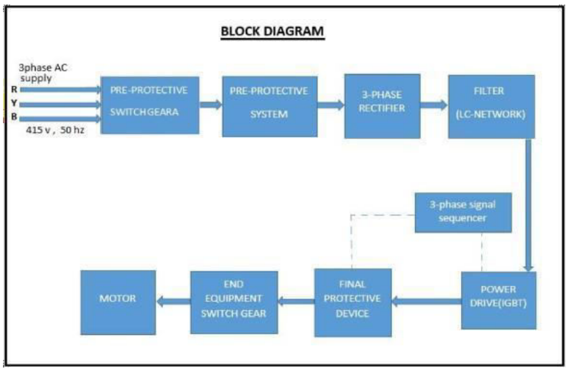
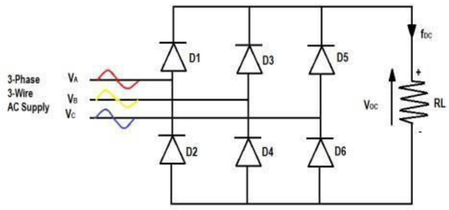
III. BLOCK DIAGRAM



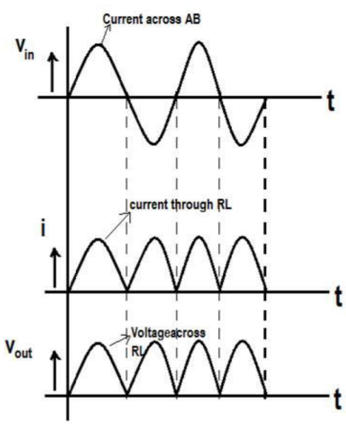
A.RECTIFIER CIRCUIT



A Three-Phase full wave diode rectifierwith purely resistive load is shown above fig 2.21 The ac voltage supply is110 V line to line and 50Hz frequency. The out put wave form of three-phase diode rectifier is shown above fig Fromthe circuit above we can see that diode,D1 starts to conduct at 30 degree when the voltage in the R-Phase is minimum. Diode D1 stops conduction and Diode D3 takes over conduction at angle 150 degree when the voltage in the Y-Phaseis maximum.

While Diode D1 conducts from 30 degree to 150 degree in the positive cycle, it is helped by the Diode D6 it helps complete the path ofreturn to the three- phase source. Diode D6 sees the maximum negative voltage, but this remains true only up to 90 degree when DiodeD2 takes over conduction from D6 complete the path along with the Diode D1. Therefore each Diode pair conducts for 60 degree, and each Diode conducts for 120 degree.

The load voltage has a ripple, and this frequency of the this ripple is 6*50=300Hz. conducting at any instant,which is incidentally also a particular line voltage depending on which Diode pair isconducting.



Above figure shows the out waveform ofa rectifier circuit.

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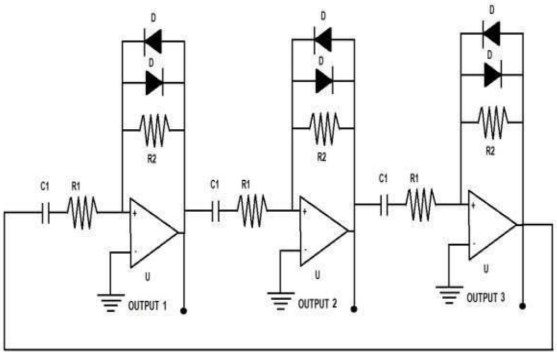
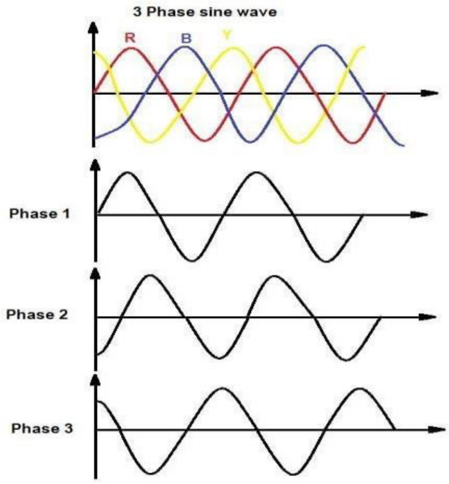
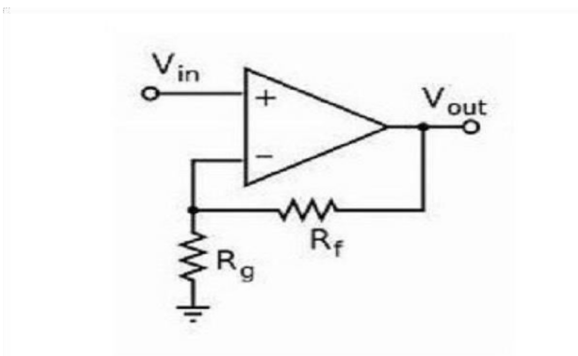
B.SIGNAL GENERATOR CIRCUIT



The circuit also can easily allow for amplitude adjustment. If you're using a DC power supply to power this circuit, then all you have to do is adjust the voltage on the DC power supply to change the amplitude of the signal. If you're powering the circuit through batteries, then you'll need add the number of batteries you would need to get the maximum voltage you want and then you add a small-**Peak Inverse Voltage** adjustment. And this is how a function D1 and D2 is 2Vmax. Peak inverse voltage is the maximum voltage a diode can withstand in the reverse-biased direction before breakdown. The peak inverse voltage of the full-wave rectifier is double that of a half-wave rectifier. The PIV across valued potentiometer, such as 200Ω-500Ω, to allow for voltage using the three phase signal generator to generator 3 phase signal in 50 words each phases are having 120 degree phase shift in the three phase signal generator we are usingLF 4113 opens its maximum voltage andcurrent ratings are shown below in the table. It generate different waveforms square triangular wave sine wave.



C.PRE AMPLIFIER CIRCUIT



In an inverting amplifier circuit, the operational amplifier inverting input receives feedback from the output of the

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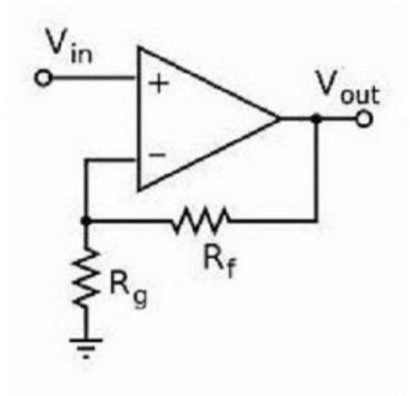
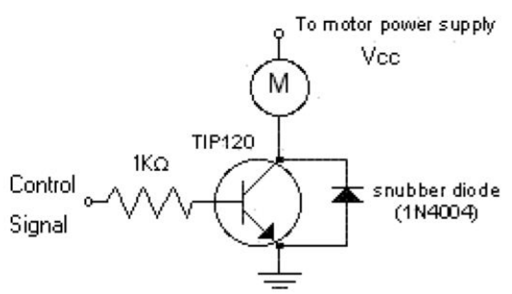
amplifier. Assuming the op-amp is ideal and applyingthe concept of virtual short at the inputterminals of op-amp, the voltage at the inverting terminal is equal to non-inverting terminal. The non-inverting input of the operational amplifier is connected to ground. As the gain of the op amp itself is very high and the output from the amplifier is a matter of only a few volts, this means that the difference between the two input terminals isexceedingly small and can be ignored. As the non-inverting input of the operational amplifier is held at ground potential this means that the inverting input must be virtually at earth potential.



The non-inverting amplifier is one in whichthe output is in phase with respect to theinput. However, the input is now applied at the non-inverting input. The output is a nonInverted (in terms of phase) amplifiedversion of input. The gain of the non invertingamplifier circuit for the operational amplifieris easy to determine. The calculation hinges around the fact that the voltage at both inputsis the same. This arises from the fact that thegain of the amplifier is exceedingly high. If the output of the circuit remains within the supply rails of the amplifier, then the output voltage divided by the gain means that there is virtually no difference between the two inputs.

D.POWER DRIVE



A transistor driver is generally used as a current amplifying device. The input isusually from a low current source such as a logic gate or a sensor. It usually drives higher current devices such as bulbs and motors. In electronics, a driver is a circuit or component used to control another circuit or component such as a high-powertransistor, liquid crystal display (LCD), stepper motors, and numerous others. They are usually used to regulate current flowing through a circuit or to control other factors such as other components, some devices inthe circuit. The term is often used, forexample, for a specialized integrated circuit that controls high-power switches in switched-mode power converters. An amplifier can also be considered a driver for loudspeakers, or a voltage regulator that keeps an attached component operating within a broad range of input voltages. Typically the driver stage of a circuit requires different characteristics to other circuit stages. For example in a transistor power amplifier circuit, typicallythe driver circuit requires current gain, often the ability to discharge the following transistor bases rapidly, and low outputimpedance to avoid or minimize distortion.

IV. CONCLUSION

In this project we have made easy to monitor the submersible motor for various parameters like phase failure, over voltage. The process we have learned about different components andhow it works and functions accurately. And also learned about different techniques to implement very well for the use of this project and otherpurposes.

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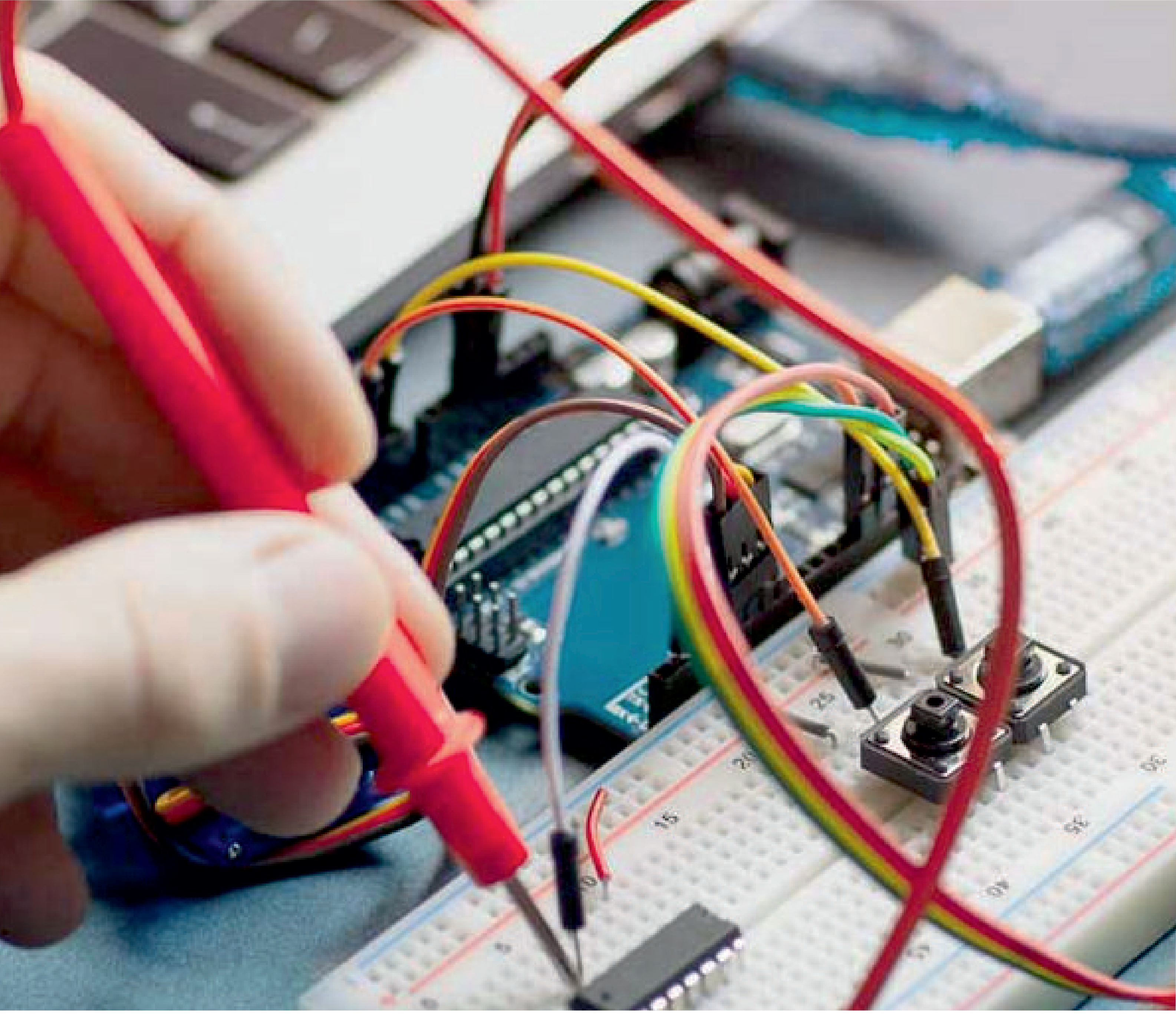

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