

POWER GRID FAILURE DETECTION BASED ON VOLTAGE AND FREQUENCY

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Abstract: In past few decades the more concentration is employed on the topic of synchronization of power grid. As the level of life style of human being is upgraded and hence the energy requirement is also increased. To achieve the require mean the grid network is not sufficient therefore it is necessarily to take power from the nearby grid. So, it is much more important to have synchronization between the grid. By proper technique the main parameters such as voltage and frequency can be kept constant. Hence it is required to have the comparison between the technique is required for the cost effectiveness, efficiency, accuracy and reliability.

KEYWORDS: Synchronization, Grid Voltage, Frequency, Effectiveness, Efficiency, Accuracy, Reliability

I INTRODUCTION

The project is designed to develop a system to detect the synchronization failure of any external supply source to the power grid on sensing the abnormalities in frequency and voltage.

There are several power generation units connected to the grid such as hydel, thermal, solar etc to supply power to the load. These generating units need to supply power according to the rules of the grid. These rules involve maintaining a voltage variation within limits and also the frequency. If any deviation from the acceptable limit of the grid it is mandatory that the same feeder should automatically get disconnected from the grid which by effect is termed as islanding.

This prevents in large scale brown out or black out of the grid power. So it is preferable to have a system which can warn the grid in advance so that alternate arrangements are kept on standby to avoid complete grid failure interest.

II METHODOLOGY

The project is designed to develop a system to detect the synchronization failure of any external supply source to the power grid on sensing the abnormalities in frequency and voltage.

Synchronization failure of an alternate supply source connected to the grid is detected By this system The failure can be either under/over voltage or under lover frequency. The Project uses a 8051 family microcontroller to perform this operation This mechanism is Popularly known as islanding of grid connected source.

a) Voltage Sensing Part :

The microcontroller is connected to the zero voltage sensing circuit to ensure the Frequency of the supply is at normal

frequency of 50Hz A VARIAC is used to get variable Voltage. Initially both the presets are adjusted such that both the output pins of the OP-AMP IC are at normal low and high level The VARIAC is adjusted so as to get the input AC voltage more than the normal value. Now the normally high pin of the OPAMP IC will go low, giving an interruption pulse to the pin of the microcontroller. The microcontroller, accordingly sends a high logic pulse to switch on the relay driver, which in turn energies the relay and the lamp glows as it gets the AC power supply. Similarity when the VARIAC is Adjusted so as to get inputs AC voltage less than the normal value, at some point, the normally Low pin of the OPAMP IC goes high and hence the lamp which start to glow

b) Frequency Sensing Part :

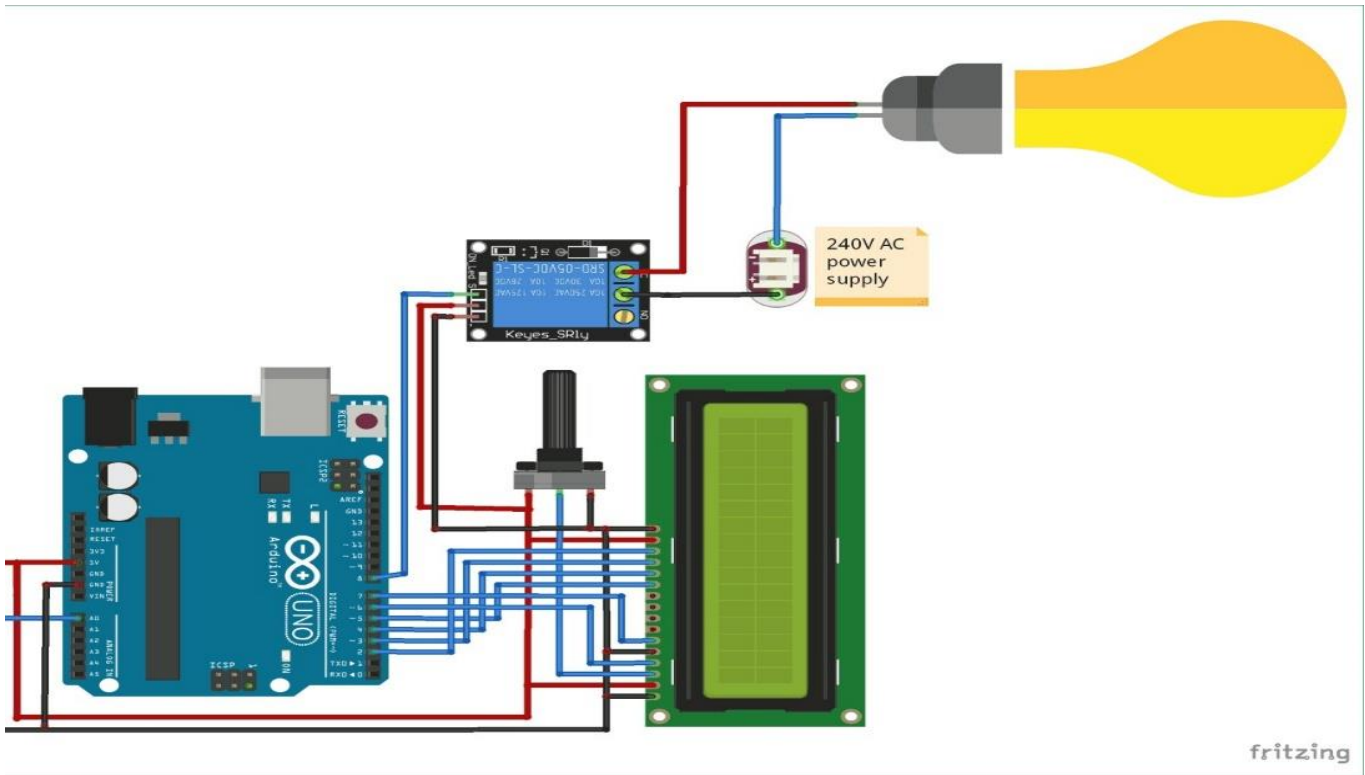
The VARIAC is adjusted such that the AC input voltage is at its normal value. The Microcontroller pin is connected to the output of the timer through a PNP transistor. The Timer work in astable mode to produce signals at frequencies which can be adjusted using the variable frequency. This output is connected to the internal timer of the microcontroller which accordingly calculate the frequency of the pulses and when the frequency of the uses goes beyond the normal frequency or less than the normal frequency, the relay drivers is triggered which in turn energizes the relay and the AC supply is given to the lamp which starts to glow.

III MODELING AND ANALYSIS

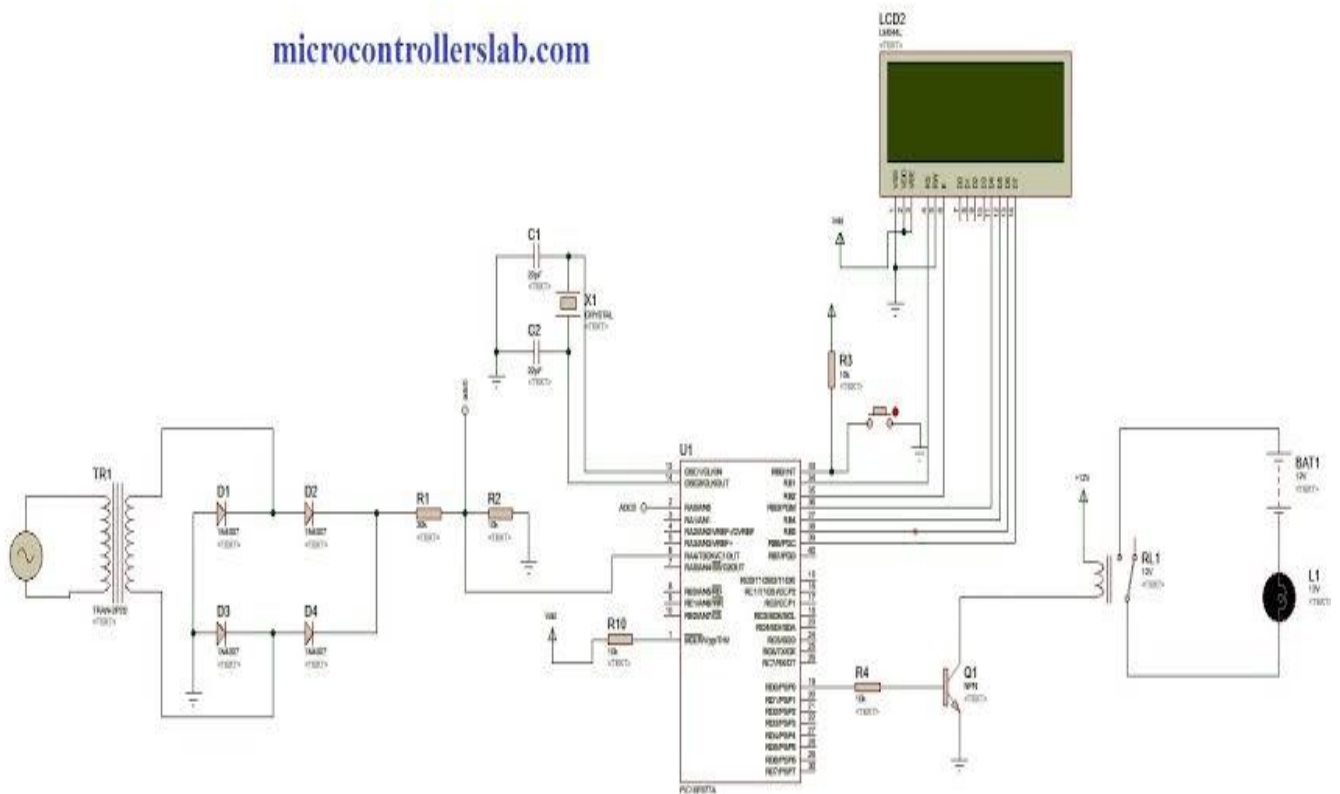
Hardware Requirements:

Power supply Block, Microcontroller, Liquid Crystal Display 555 Timer, LM358, LM339, Relays, Push Button, BC547,LED IN4007, Resistors, Capacitors

Project Development:



SIMULATION :



IV RESULTS AND DISCUSSION

Voltage detection is by done by varying the Potentiometer after reaching the acceptable Range the LCD displays that the voltage exceeded 230V and the Relay will be tripped and load of AC is protected. The Frequency detection is done before The tripping of the Light load the light flicker and frequency change will be displayed on the LCD.

Hence a continuous Monitoring load and faults in frequency and Voltage is Done by using microcontrollers. IN this case the load Variation will be detected.

Voltage	Frequency	LCD Display Indication	Lamp Indication
=230 V	50 Hz	Stable	On
<230 V	<50 Hz	Low V &F	Off
>230 V	>50 Hz	High V&F	Off

V CONCLUSION

The project is designed to develop a system to detect the synchronization failure of Any external supply source to the power grid on sensing the abnormalities in frequency and voltage.

This prevents in large scale brown out or black out of the grid power. So it is preferable to have a system which can warn the grid in advance so that arrangements are kept on standby to avoid complete grid failure.

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