Automatic Synchronization of Alternator with Bus-bar System

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ABSTRACT

In this paper, a modern method for automatic synchronization of alternator with busbar has been explained without the help of any manual interpretation. Alternator can be synchronies automatically with bus bar with our control. The voltage, phase sequence and frequency of the incoming alternator is compared with the infinite bus bar with the help of various sensing modules and interpreted by Arduino. Is the condition are observed to be optimistic then automated synchronization is done with a prior indication the system is entirely automated and works entirely on proteus environment. This synchronization technique is cost-effective, reliable, fast and precise to be used for measurement, control, monitoring and parallel operation of alternator this research is a made to overcome the drawbacks of manual method of alternator synchronization.

***Keywords**- Arduino, Current transformer, potential transformer, phase sequence indicator, Synchronization*

1. INTRODUCTION

The method of connecting two or more alternator in parallel to each other or one alternator to the infinite bus bar is known as synchronization. Electrical power system consist of the interconnection of large numbers of alternator operating in parallel, interconnected by transmission lines and supplying large number of widely distributed loads. The voltage and frequency of the infinite bus bar is constant. There are many benefits of operating many alternators in parallel to each other like continuity of power supply, reliability, high efficiency, flexibility and expandability. Single alternator is not capable of supplying large load. Several alternators can

connected in parallel to supply large loads. During periods of light load, one or more alternator may be shut down and those remaining operate at or near full load and thus more efficiently. When one machine is taken out of service for its scheduled maintenance and inspection, the remaining machine maintains the continuity of supply. If there is breakdown of alternator, there is no interruption of power supply. In order to meet the increasing future demand of load more machines can be added without disturbing the original installation. Synchronization by means of manually operated switching is not suitable for the system having large capacity. Hence there is a need of automatic synchronization in a power station or in an industrial establishment where generators are employed. In automatic synchronization process, the adjustment of magnitude of voltage, frequency and phase sequence of incoming alternator is done automatically.
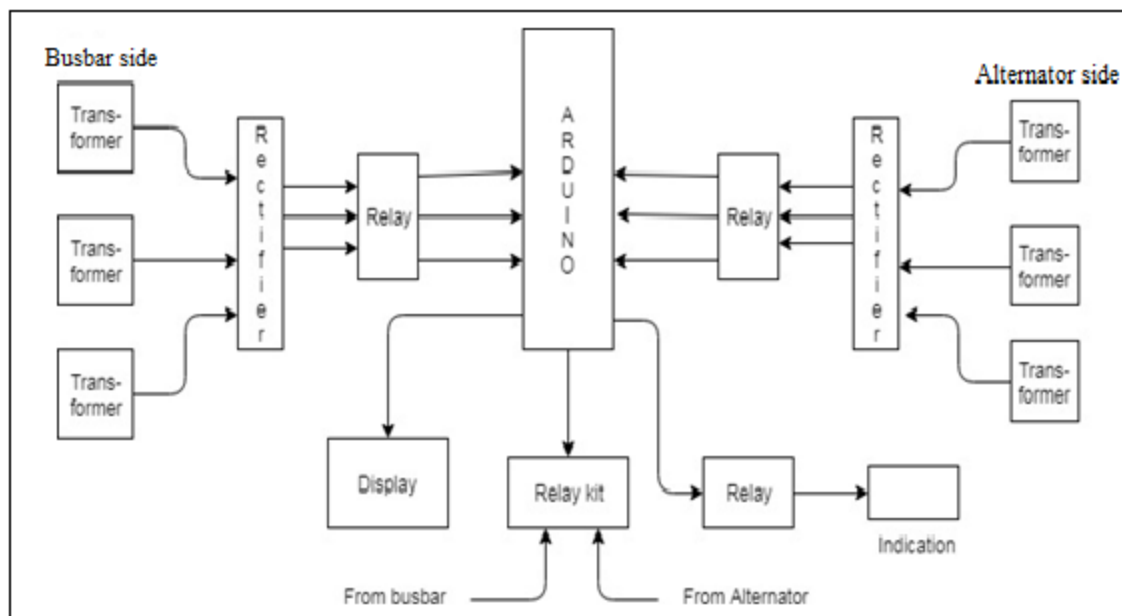
2. BLOCK DIAGRAM

Fig1.Synchronization unit

Main component-

- Alternator
- Bus bar
- Arduino
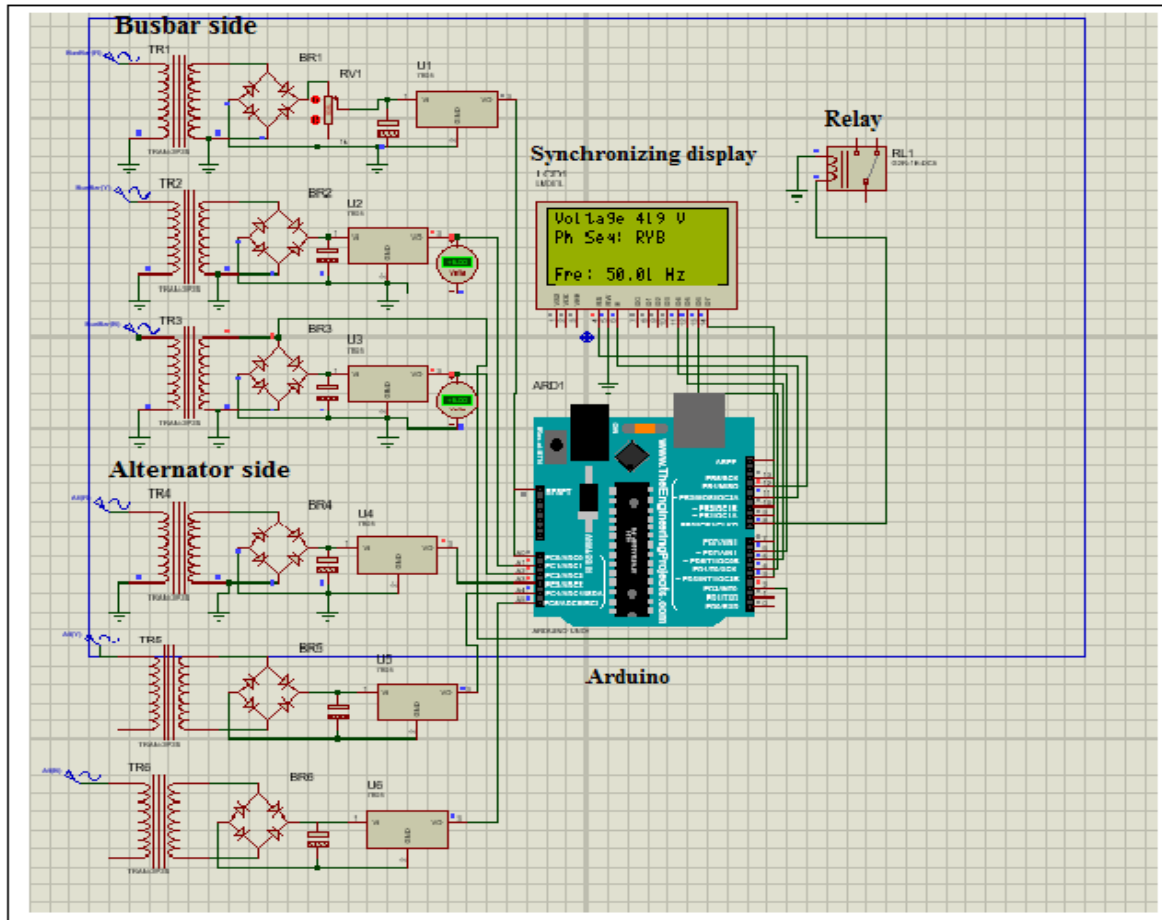- Transformer
- Relay

3. SIMULATION DESIGN

Fig 2.Operational diagram

4. OPERATION

Between alternator and bus bar-

The alternator side three phase supply is given to the step-down transformer which is reduce voltage level. Then the normally 12v or 6v supply is given to voltage regulator 7805 reduce to 5v. This 5v is given to filter circuit to remove harmonics. Then the 5v dc supply is given to Arduino (Same as for all three phases, same as for bus-bar side). Arduino will compare following parameters between alternator and bus- bar

- Voltage
- Phase sequence

- Frequency

If all parameters are matched then the alternator is ready or capable to synchronize with bus- bar. Arduino will give signal to relay kit to synchronize both. Arduino will read the signal and display voltage, phase sequence and frequency. If anyone parameter will parameter will fail or mismatched then relay will automatically disconnect the synchronization.
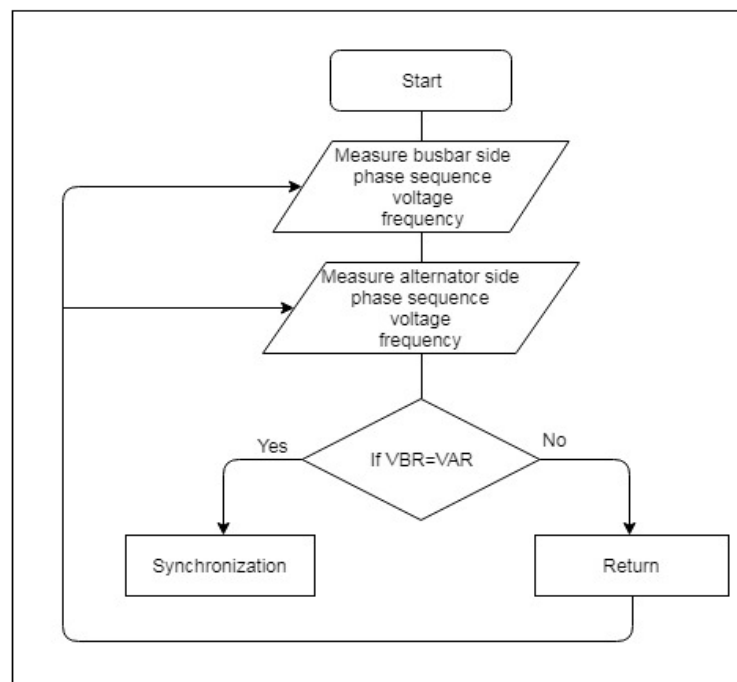
4.1 FLOWCHART OF THE SYSTEM

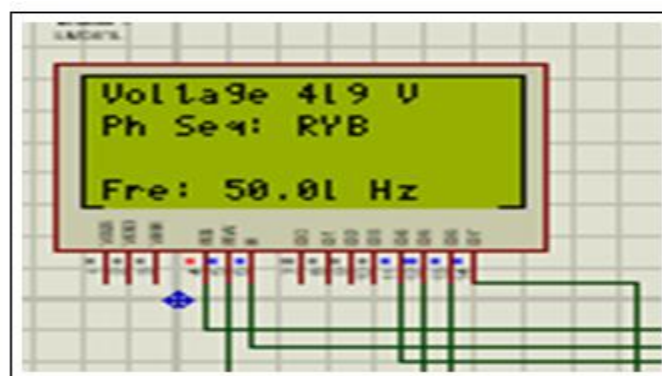Fig 3.Flowchart

5. RESULT

Fig 4. Result

Arduino will read the signal and display voltage, phase sequence and frequency. If anyone parameter will parameter will fail or mismatched then relay will automatically disconnect the synchronization. Arduino will read the signal and display voltage, phase sequence and frequency.

6. CONCLUSION

In this paper we have designed automatic synchronizing system. This has effectively operated in synchronization process with automatic control based on digital controller with quick operation

7. ACKNOWLEDGEMENTS

This paper is part of the Excellency of the final year making our project feasible on the subject of 'Automatic Synchronization for Alternator with bus-bar system'. It gives us great pleasure to acknowledge. All blessing and inspiration which we did get during our project work.

8. REFERENCES

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