Automatic Single Phase Changer without using Microcontrollers

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Abstract- *Phase selector is a mechanism used in alternating or switching between power phases has been frequent phase failure in the power phases resulting to manual switching of the fuse from one phase to the other. However, this project focuses on the design of a phase selector using automatic switching mechanism. This during its operation transfers the consumer's loads to the available power source in the case of power failure in the power supply from the national grid and automatically detects when power is restored to the failed phase and returns the loads to this source. In the course of this design, several tests were carried out such as the continuity test of contactor and relay coils to ascertain low resistance, continuity test on the contacts of the materials used to ensure free flow of current, conductivity of the wires and the whole system. This project does not require any micro controllers, due to this system flexibility will increase. The project is implemented in real time without using any digital controllers.*

Keywords- *Three phase supply (RYB), transformer (step down), and solid state relay.*

I. Introduction

However, most companies; Industrial, commercial and even domestic are dependent on public power supply which have erratic supply such as phase failure, phase imbalances or total power failure due to one or more technical problem in power generation, transmission or distribution. Hence, there is need for automation of state change during phase failure or full power fail in command to unendangered keep destroyer appliances from epileptic influence supply. In most cases, many manufacturing assembly, be it maid or business, which employment single appearance accouterment for its function sometimes share object during unbalance voltages, overlade and under-voltages, in power accommodate, much time would be claim in the preserver of keyboard change over. This indicate that opportunity and the process needed for the nonplus exchange may object serious damages to machines and even the products; hence, there is extremity for automatic state switching system. In a suit where a single phase general profit prepaid meter is manage with a sincere phase power furnish unit and there is disconcert failure from the common benefit sway furnish, the prepaid verse will discontinue pericope. At this moment if the disconcert is not manually changed, the simple disconcert prepaid meter will impede version. That is to say someone needs to be present always to make the exchange at any prick in time. But to overcome these policy, machine rifle systems poverty to be manner. The importance and improvement of control system in engineering have appoint separate ways in which automatic switching systems can explanation boy and business problems peculiarly in the underdeveloped countries. An machinelike nonplus changer was designed. The system condition a separate appearance correct voltage in the same might administer lines through translator from the other disconcert where correct voltage is available. The system operates by stepping down 220 Volts AC to 12 Volts, amend and fed into the functional amplifiers through the voltage room divider encircle. The in order (predicate) amplifiers get the three phases and specified the relays through the transistor drivers. The automaton like phase changer was made from several electronic components which includes; operable amplifiers, diodes, resistors, capacitors, Zener diodes, transformers, relays

II. Content

This during its operation give the destroyer's loads to the handy sway rise in the case of dominion failure in the command administer, from the general grid and automatically detected when influence is reinstate to the failing phase and returns the loads to this origin. In the way of this mean, several touchstones were capture out such as the continuum distinction of contactor and relay coils to ascertain low resistance. The continuity judgment on the terminal of the materials application to ensure innocent proceed of course, conductivity of the score string and the whole system. This shoot does not need any micro

controllers, due to this system flexibility will increase.

III. Microcontroller based system

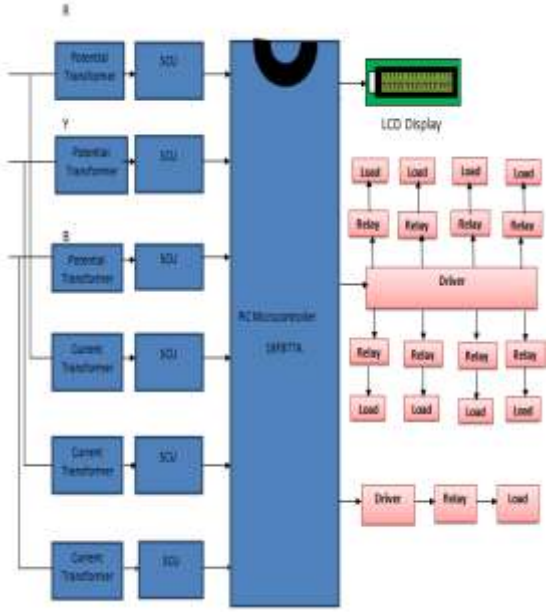

Fig.1.Block diagram

The microprocessor-supported subdue manifestation control do through a pivotal processing one design in a software-accomplish arrange and stored in core wander Access remembrance and recite only memory subsequently necessity to manifestation controls in unalloyed time.

IV. Without microcontroller based

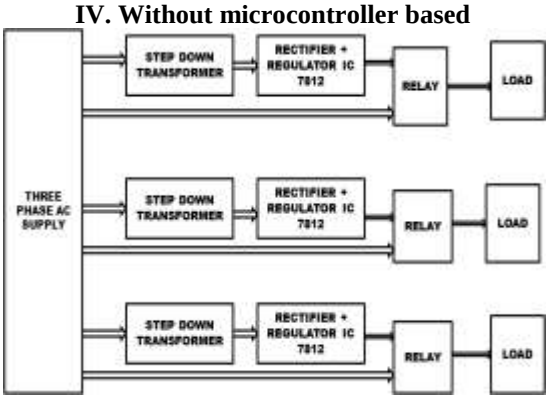

Fig.2.Block diagram

There are three phases R, Y, B which are given to signal conditioning block The output of this system is in the form of an electric bulb which glows for the correct output voltage.

The input supply three phase using in 230 v and output is step down from 12v .the output from ac voltage need for dc supply the rectifier using convert the ac to dc supply. The relay is operating in constant dc supply. The capacitor dc supply is variable dc supply relay constant dc voltage regulator use convert from constant or fixed dc voltage.

Wave sequence

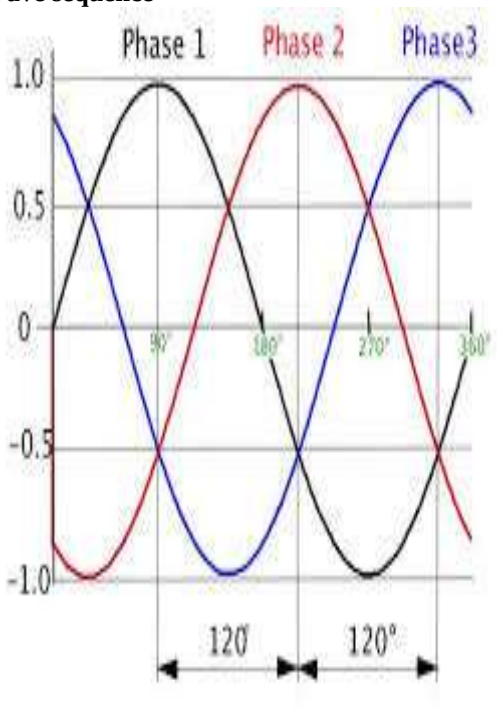

FIG.3.Wave sequence

There are three phase sequence wave form in R, Y .B the input from 230 voltages. The output is same voltages.

Circuit Diagram-12 Power Supply

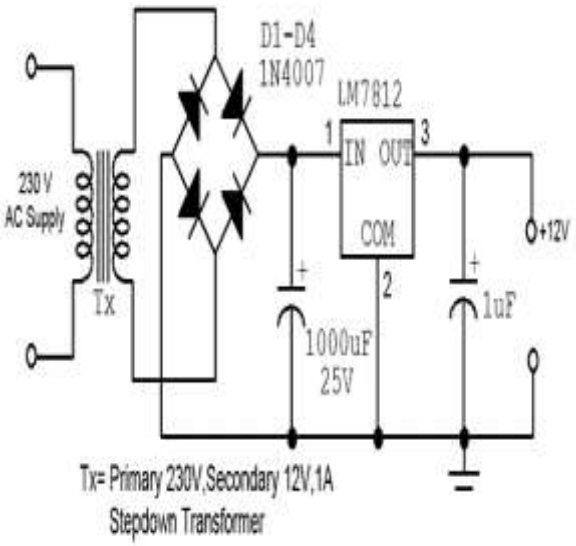

Fig.4.Circuit diagram

Relay

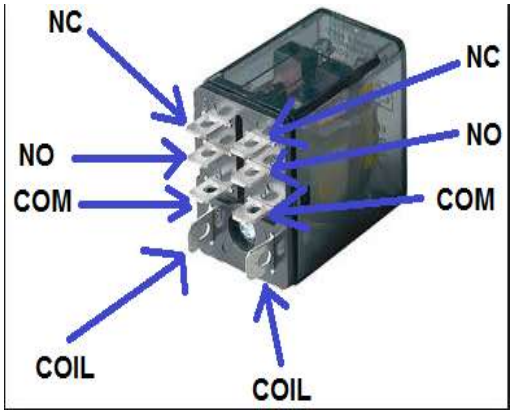

Fig.5.Relay

The commonly relay is a one of the switching operation.

The relay is normally there are three pines. Are normally closed, normally open, and common pin. The relay input is 230 volt dc supply and output is 230 the relay is solid state relay.

The relay operating voltage is 12 voltages.

Working Mode

Input Red Phase, R	Input Yellow Phase, Y	Input Blue Phase, B	Output Voltage
0	0	0	No Supply
1	0	0	Phase R
0	1	0	Phase Y
0	0	1	Phase B
0	1	1	Phase Y or B
1	0	1	Phase R or B
1	1	0	Phase R or Y
1	1	1	Phase R or Y or B

Fig.6.working mode

V. Hardware Implementation

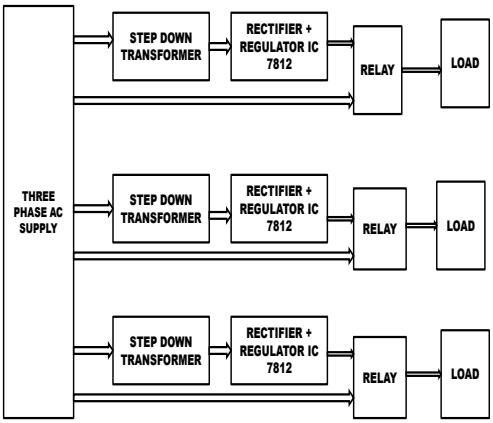

Fig.7.Hardware implementation

There are three phases R, Y, B which are given to signal conditioning block.

The output of this system is in the form of an electric bulb which glows for the correct output voltage.

This project proposes three phase automatic phase changer without using any digital controllers. Solid state Relays are used to achieve this project. This project can automatically turn on the next phase when first phase is shutdown. The reliability is increases due to the absent of micro controller.

VI. References

[1]. Nweke F. U., Anyigor I. S., Ekpe J. E. and Egba E. I. (2012). Essentials of Electricity Generation, Transmission, Distribution and its Hazards. International Journal of Advancement in Physics. Vol 4. Number1. Pp 55-56

[2]. Nweke F. U. (2010). Workshop Processes and Practice: Electronics and Electrical Installation. IZU Prints Abakaliki Nigeria.

[3]. Guasch L., Corcoles F. and Pedra J. (2000). Effects of Unsymmetrical Voltage Sag types E, F and G on Induction Motors. Proceedings of the conference on Harmonics and Quality of Power 3(3) 796-803.

[4]. Greenfield J. D. (2006). Practical Digital Design using Integrated Circuits. New York. John Willey and Sons Incorporation.

[5]. Gupta B. R. (2001). Principles of Electrical Engineering. 96th edition S. Chad & Company LTD, New Delhi.

[6]. Boylestad R. and Mashelskey I (1996). Electronics Devices and Circuit Theory. New Jersey, USA Prentice Hall Inc.

[7]. Theraja B. L. and Theraja A. K. (1997). A Text book of Electrical Technology. 25th edition. Chad & company Ltd, Ram and Nagar ,new Delhi.