

SINGLE PHASE MICROCONTROLLER-BASED AUTOMATIC CHANGE OVER SWITCH

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ABSTRACT

Power failure or outage in a country, state or city is highly detrimental to development in public and private industries. The insecurity associated with constant or frequent power failure or outage brings about limitation to power consistent investments, thus hampering the development of industries and multinational ventures. Processes like carrying out surgical operations in hospitals, laboratories which require constant power supply for research, money transactions between banks and more require constant use of uninterrupted power. This research covers the design and construction of a single phase microcontroller-based automatic power changeover. It has the capacity to automatically switch power from national grid to generator and vice versa, once there is power failure in any of the two power supplies. This was achieved by the use of electrical components such as resistors, capacitors, diodes, transistors, opto-isolators etc., integrated circuits that have timing abilities and relays for switching effect. Due to the looping of the pole of the contactor to give 50A current each for PHCN and generator, the maximum power the circuit can withstand on an a.c voltage of 240V is 12KVA. This means the circuit can carry a large amount of power in homes and offices.

KEYWORDS: *Changeover Switch, Microcontroller, Contactor, Power Supply, Opto-Isolator*

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1.0. INTRODUCTION

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The need for constant and stable power supply in a country, state or city cannot be overemphasized. In most developing nations, industries, firms and organizations contest for power supply that is unreliable and insecure, thus marring the effect of productivity and development. In these nations, the quest for secure and reliable power supply remains a dream yet to be achieved. This is as a result of increase in population, industrialization, urbanization (Aguinaga, 2008; Fuller, 2007; Kolo, 2007) and lack of proper planning by the government and utility providers. Most manufacturing industries, firms and institutions such as hospitals and healthcare facilities, financial institutions, data centers and airports to mention, but a few require constant power supply throughout the year. Volatility in power generally delays development in public and private section of any economy (Kolo, 2007; Anon, 2010; Chukwubaike, 2012). For instance, power failure could lead to prohibitive consequences ranging from loss of huge amounts of money to life casualties (Aguinaga, 2008).

This instability in power supply has led to the development of switching systems between national grid power system and standby generators used as backup. In the past decade, various equipment and configurations have been put in place in order to manage this problem (Aguinaga, 2008). An automatic changeover switching system makes use of contactors, active and passive components and transducers to realize changeover in a shorter

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