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CONSTRUCTION AND CHARACTARIZATION OF A DESIGNED 500VA TRANSISTOR CONTROLLED INVERTER

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Abstract
This work entails design and analysis of a 500VA transistor controlled inverter suitable for the Nigerian society. Powered by a 12V DC battery, it is a supplementary means of generating AC in case of electric power failure to consumer equipment. The 12V DC from battery source is fed into an astable multivibrator IC (4047) to change the DC source to AC of low voltage. This is then passed to the transistor controlled drivers and switches, and tidally stepped up via a step-up transformer to 240V, 50Hz which is the standard line voltage and frequency in Nigeria. The 12V DC battery is an external power source, which is charged by a charging circuit incorporated into the design of the system unit. The overall system design is therefore a compact assembly that can take the place of electric generators currently in vogue in most households by providing an environmentally friendly back-up power to commensurate for frequent power outages.

Key words: Inverter, transistor, standard line voltage and frequency.

Introduction

Following the intermittent electric power failure, the need for stable power supply to equipment such as computer, TV sets, theatre equipment in the hospitals and a host of others led to the development of the inverter systems with different design based on the technology employed. Inverter is a means through which an alternating current (AC) is produced from a direct current (DC) power of a desirable output voltage, current and frequency (Fink and Beaty (1998). Thus an inverter compensates for the possibility of power failure. Frequent public power outages have led to massive use of generators with its negative consequences which includes; noise, fire outbreak and environmental pollution, (Amachire, 2008). Inverters overcome these draw backs being silent, requires no fuelling, cheaper and environmentally friendly. The output frequency for this design is 50Hz and a peak voltage of 240V is in agreement with national standard. Its driving circuit incorporates Bipolar Junction Transistor (BJT) as the main switching component. In this case, BJTs were chosen as the high power output device due to its excellent power handling capability, fast switching action, high voltage and high current rating with low heat dissipation.

Methodology

The design considered for the inverter comprises of various units. Detailed analysis and calculations were also carried out. Fig. 1. is the block diagram of the inverter system. It shows all the individual components of a system and how the signal flows through the system (Schuler, 1984).

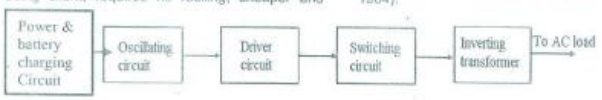

Fig 1: Block diagram of an inverter