FINAL YEAR PROJECT REPORT

ADVANCED DIPLOMA IN ELECTRICAL ENGINEERING

SCHOOL OF ENGINEERING

LOAD BALANCING TECHNIQUE USING SEMICONDUCTOR DEVICES.

BY :

NOR AZLAN B. HJ. ABDUL AZIZ

90011555

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ABSTRACT

The objective of this project is to study the feasibility of developing a new method for balancing 3-phase unbalanced load with respect to the supply system using an inverter device. This report comprise of three stages : (i) computer simulation (ii) hardware design and (3) experimental research. The first stage describes the analysis of an inverter in which the schematic configuration is simulated using Saber software. The predictions of the simulation is to demonstrate that the design is correct and to reveal any oversights that might affect its function as an inverter. Finally, the inverter was applied to a 3-Ø system to ascertain its performance.

INTRODUCTION

Power is supplied by 3-phase generators. It is then transferred and distributed in the form of 3-phase power except at the lowest voltage levels of the distribution system, where single phase is used.

A 3-phase source is balanced if it is composed of three individual sources in a wye or delta configuration and the source voltages (or currents) differ only in their angles with 120°. For example, line-neutral voltages Ean = $1 \angle 0^{\circ}$, Ebn = $1 \angle -120^{\circ}$, Ecn = $1 \angle 120^{\circ}$ are a balanced 3-phase source.

The adversed effects of unbalanced supply on plant equipment and on consumers has becoming significant over the years and studies were progressively carried out to minimised these effects to a level that can be tolerated.

In 1918 one of the most powerful tools for dealing with unbalanced polyphase systems was discussed by C.L. Fortescue at a meeting of the American Institute of Electrical Engineers [1]. His work proves that an unbalanced system on n related phasors can be resolved