DESIGN AND HARDWARE IMPLEMENTATION OF HIGH-POWER-FACTOR (HPF), THREE-PHASE AC-DC CONVERTER EMPLOYING CURRENT INJECTION TECHNIQUE

This project report is presented in partial fulfillment for the award of the

Bachelor in Electrical Engineering (Hons.)

Of

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ACKNOWLEDGEMENT

Syukur alhamdulillah, all the praises and thanks to Allah, the Lord of universe that give me strength and energy to successfully complete this final year project report on schedule.

I would like to express a lot of appreciation and thanks to my final year project supervisor, Dr. Mohammad Nawawi Seroji for giving me an opportunity and full support to carry out this project. Without his invaluable suggestion, guidance, constant encouragement and existence, this project would not be completed and successful.

I would like to give my sincere thanks to electrical engineering lecturers for their support and encouragement directly or indirectly throughout my course in UiTM.

Not forgotten to all my friends, a million of thanks for your cooperation, guidance and moral support. May Almighty Allah bless and reward them for their generosity. Also to people who involve in this project directly or indirectly, which enable this project to be completed as required. I hope that the knowledge and skills that i have obtained from this final year project will be useful for my future.

Finally, with my love and gratitude, I also want to dedicate this thesis to my family who has supported me throughout, especially to my mother and my father.

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ABSTRACT

This paper proposes a high-power-factor, three- phase AC-DC converter that employs a high frequency resonant current (CISRC) topology. Resonant conversion techniques are used, and a high-frequency current injected into the three phase rectifier to achieve a high power factor. The current injection principle is explained and the results are validated by comparison with mat lab simulation and measurement from a prototype 300W and 45V input.

Keywords:

Three-phase AC-DC converter, Current injection, High-power-factor rectifier, resonant converter.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

This chapter will cover the main idea of research and all the necessary details that contributes to the outcome of the research.

1.1 BACKGROUND STUDIES

Power electronics is being used to control the power flow with high efficiency and in a cost-effective manner. Nowadays, it is not impossible to produce transformer and reactive components in a smaller physical size. A principle mean for improving performance and reducing the physical size of power electronics component is through the increase in switching frequency. However, due to the switching losses this solution is not suitable.

Power converters enable much higher switching frequencies than can be achieved with the conventional pulse-width modulated circuits, due to their natural soft-switched operation and ability to absorb and utilize circuit parasitic in the conversion process. The resonant power conversion technique are introduced because of their higher frequency operation, smaller physical size, lighter weight, reduced electromagnetic interference, relatively higher efficiency, better dynamic response, and virtually no switching losses through the use of zero voltage switching.