## STEP DOWN THREE PHASE CONVERTER

## MD AFANDI BIN ATAN

# FACULTY OF ELECTRICAL ENGINEERING UNIVERSITI TEKNOLOGI MARA MALAYSIA

## STEP DOWN THREE PHASE CONVERTER

## Thesis presented in partial fulfillment for the award of the Bachelor of Engineering (Hons) Electrical UNIVERSITI TEKNOLOGI MARA



MD AFANDI BIN ATAN
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR

#### **ACKNOWLEDGEMENTS**

Alhamdulillah, for the highest thank to God because with His Willingness I possible to complete this final year project which is Step Down Three Phase Converter.

The special thank to my helpful supervisor, En Zulkifli Othman for his advice and support throughout for this project. The supervision and support that he gave truly help the progression and smoothness of this project and the co-operation is much indeed appreciated.

Great deals appreciation goes to the contribution of my faculty – Faculty Electrical Engineering in helping to complete this program. Last but not least I would like to thank my family, to my friends and to the people who gives support directly or indirectly to the project and during the thesis writing.

Once again, thank you very much.

### **ABSTRACT**

This paper was conduct to research the step down three phase ac/dc converter involving a simple topology of 6 ideal switches using MATLAB/SIMULINK simulation model. This project consists of two parts. First part is ac-to-dc converter and the second parts are consisting of buck converter. In this project use the fast control strategy of three phase ac/dc by pulse-width modulation (PWM) converter and the input current is regulated to be sinusoidal and the source power factor can be controlled at unity. This project considered the total harmonic distortion (THD) which was defined as the power summation ratio of all harmonic components to the fundamental frequency power.

## **TABLES OF CONTENTS**

Titles			Page
Approval			iii
Declaration			iv
Dedication			v
Acknowledgements			vi
Abstract			vii
Table of Contents			viii
List of Figures			x
List of Tables			xiii
List of Symbols and Abbreviations			xiv
CHAPTER	1: INTRO	DUCTION	
1.1. Introduction			1
1.1.1	Rectifier		2
	1.1.1.1.	Single phase rectifier	3
	1.1.1.2.	Single phase dual converter	7
	1.1.1.3.	Three phase fully controlled converter	9
1.1.2	Controlled		12
	1.1.2.1.	Sinusoidal Pulse Width Modulation	12
	1.1.2.2.	Pulse Width Modulation	14
	1.1.2.3.	Space Vector Pulse Width Modulation	16
1.1.3	DC-DC regulator		17
	1.1.3.1.	Buck regulators	18
	1.1.3.2.	Boost regulators	21
	1.1.3.3.	Buck-boost regulators	23
	1.1.3.4.	Cuk regulators	26
1.2. Objectives			29
1.3. Significance of Study			29
1.4. Scope of Work			29
1.5. Flow Chart			30
1.6. Thesis Organization			31