

**THREE PHASE PULSE WIDTH MODULATION (PWM) INVERTER  
USING PIC16F84A MICROCONTROLLER**

**This project thesis is presented as fulfillment for the award of the**

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## **ABSTRACT**

Sinusoidal pulse width modulation (SPWM) technique is one of the PWM techniques that had been used to operate three phase inverter. It is used three sinusoidal wave displace in  $120^\circ$  phase difference as a reference signal for three phase inverter. This paper represents a three phase sinusoidal PWM power MOSFET inverter using PIC16F84A microcontroller with 700VA output power. The Sinusoidal PWM signal is generate using PIC16F84A microcontroller to control the switching period turning on and off of the power MOSFET. This paper also represents a three phase inverter circuit design and simulation using Proteus simulation software. Proteus simulation software is used to design a schematic circuit for three phase inverter and produce three phase sinusoidal waveform. Three phase power MOSFET inverter hardware is used to operate three phase induction motor with 200W rated power in 50Hz frequency. The inverter portion of the design consists of a power MOSFET, integrated gate drive, PIC microcontroller and additional related circuitry.

# TABLE OF CONTENTS

<b>DECLARATION</b>	<b>i</b>
<b>ACKNOWLEDGEMENTS</b>	<b>ii</b>
<b>ABSTRACT</b>	<b>iii</b>
<b>TABLE OF CONTENTS</b>	<b>iv</b>
<b>LIST OF FIGURES</b>	<b>vi</b>
<b>LIST OF TABLES</b>	<b>viii</b>
<b>LIST OF ABBREVIATIONS</b>	<b>ix</b>
<b>1 INTRODUCTION</b>	<b>1</b>
1.0 Introduction	1
1.1 Project Overview	1
1.2 Project Problem Statement	3
1.3 Project Objectives	3
1.4 Project Scope and Limitations	4
1.5 Project Contribution	4
<b>2 LITERATURES REVIEW</b>	<b>5</b>
2.0 Introduction	5
2.1 Three Phase Inverter	5
2.2 Three Phase Multilevel Inverter	7
2.3 Three Phase Voltage Source Inverter	8
2.4 Pulse Width Modulation (PWM) inverter	9
2.5 The Differences Between 180o Conduction and 120o Conduction	13
<b>3 METHODOLOGY</b>	<b>20</b>
3.1 Project Overview	20
3.2 Flowchart of Pulse Width Modulation (PWM) Coding	21
3.3 Simulation	23
3.4 Hardware Implementation	24
<b>4 RESULTS AND DISCUSSION</b>	<b>29</b>

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

Section below focuses on what is expected to be done during the project period. It will also outline the general background, activities done and project goals. Furthermore, in order to give a more deeply concern, it will list out the key reasons for launch and the primary concerns that cause this project compulsory to be launched.

### 1.1 Project Overview

An induction motor is a constant-speed motor when it is connected to the power supply with constant-voltage and constant-frequency [1]. The operation of three phase induction motor is near to three phase synchronous motor. It is well suited for appliance that required constant-speed operation [1]. Large three phase induction motor that operates in tens or hundreds horsepower is used in industry such as compressor, paper mills and so on [2].

Theoretically, inverter is conversion equipment that used to convert direct current (DC) source to alternating current (AC) source [3]. Three phase inverter is divided into two categories which is three phase voltage source inverter (VSI) and three phase current source inverter (CSI) [7]. Voltage source inverter (VSI) and current source inverter (CSI) forms the voltage and current with required properties which is magnitude, phase and frequency [7]. VSI is the most commonly used type of inverter and it has low internal impedance [7]. In this project, three phase voltage source inverter is used to operate three phase induction motor. Three phase source consists of three single phase sinusoidal waveform that can be achieved by injected DC voltage source and switching the source across the load using switching component such as power MOSFET. The period and