UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF POWER FACTOR AND CAPACITOR VALUE MEASUREMENT

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (industrial power) with Honours.

by

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electrical Engineering Technology (industrial power) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Laporan ini ditulis bertujuan untuk mengurangkan caj tambahan yang akan dikenakan sekiranya nilai faktor kuasa dibawah 0.85. Hal ini juga melibatkan jangka masa keupayaan peralatan elektrik untuk bertahan sekiranya nilai faktor kuasa tidak didalam jarak antara 0.85 sehingga 1. Selain itu juga, nilai faktor kuasa yang tidak mencapai had piawai akan menyebabkan wayar yang bersambung kepada beban akan kepanasan. Hal ini akan menyebabkan berlakunya litar pintas dan kebakaran akan berlaku. Seterusnya, nilai faktor kuasa yang tidak mencapai piawai menyebabkan sesebuah kilang atau bangunan yg mempunyai beban seperti motor aruhan akan memerlukan kuasa yang banyak dan menyebabkan bil elektrik akan meningkat serta tidak efisyen. Projek yang akan dibina ini dapat membantu memaparkan nilai kapasitor yang perlu digunakan untuk membaiki faktor kuasa berdasarkan nilai bacaan arus dan voltan. Pengiraan ini akan dilakukan oleh Arduino UNO yang telah di progamkan terlebih dahulu dan memaparkan nilai kapasitor pada LCD.

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ABSTRACT

This report is written to reduce the additional charge that will be incurred if the power factor value is below 0.85. This also involves the duration of electrical equipment to survive if the power factor value is not within the range of 0.85 to 1. Additionally, the power factor values that do not reach the standard limit will cause the wires connected to the load to be overheated. This will cause short circuit and fire will occur. Furthermore, the value of non-standard power factor causes a factory or building that has a load like induction motor will require a lot of power and will cause the electricity bill to rise and not efficiently. This project will help display the capacitor values that need to be used to repair power factor based on the value of current and voltage readings. This calculation will be performed by Arduino UNO which has been pre-emitted and displays the capacitor value on the LCD.

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DEDICATION

This report is intended to reward my family and my mother and father Amran bin Abdullah and Noor Hayati binti Mohamed for all the support and motivation and advice and ringgit devoted to me to complete and produce these reports and projects. do not forget to my supervisor En.Azhan Ab Rahman who helped, supported, and devoted his knowledge and ideas to completing this report and project. Otherwise, I would like to thank fellow friends who assist in solving technical problems during the process of completing this project. Finally, without them I can not finish the project successfully and perfectly.

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TABLE OF CONTENTS

		PAGE
TABLE OF CONTENTS		**xii**
LIST OF TABLES		**xvii**
LIST OF FIGURES		**xviii**
LIST OF APPENDICES		**xxi**
LIST OF SYMBOLS		**xxiii**
LIST OF ABBREVIATIONS		**xxiv**
CHAPTER 1	**INTRODUCTION**	
1.1	Background	1
1.2	Statement of the Purpose	2
1.3	Problem Statement	2
1.4	Scope	4
1.5	Objective project	4
CHAPTER 2	**LITERATURE REVIEW**	
2.1	Introduction	5
2.2	Power factor in general	6

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2.3 Basic of power factor 7

2.3.1 Real power 7

2.3.2 Reactive power 7

2.3.3 Apperent power 8

2.3.4 Power triangle 8

2.3.5 Reason for low power factor 9

2.3.6 Effect using low power factor 9

2.3.7 Disadvantage of low power factor 9

2.4 Improvement of power factor 10

2.4.1 Calculation of power factor correction 12

2.5 Power factor improvement method 12

2.5.1 Capacitor method 13

2.5.1.1 Advantage and disadvantage using capacitor 14

2.5.2 Using Synchronous condenser 15

2.5.2.1 Advantage and Disadvantage using Synchronous Condenser 16

2.5.3 Using Phase Advance 16

2.5.3.1 Advantage and Disadvantage using Phase Advancer 17

2.6 Capacitor Bank 18

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2.7 Capacitor Bank Type 19

2.7.1 Externally Fused Capacitor Bank 19

2.7.2 Interally Fused Capacitor Bank 20

2.7.3 Fuse Less Capacitor Bank 21

2.8 Summary 23

CHAPTER 3 METHODOLOGY 24

3.1 Introduction 24

3.2 Project Flow Chart 25

3.3 Part and Equipment Project 26

3.3.1 Arduino Uno 27

3.3.2 LCD (liquid crystal display) 28

3.3.3 Pzem-004T 29

3.4 Method and Connection 30

3.4.1 Coding Arduino 30

3.4.2 Ardunio to LCD 16x2 33

3.4.3 Arduino to PZEM-004T 34

3.4.4 Full Circuit Connection Project 35

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3.5 Project Overview 36

3.6 Ghant Chart 37

CHAPTER 4 RESULT AND DISCUSSION 39

4.1 Introduction of result 39

4.2 Full of project 39

4.3 Result 41

4.4 Collection of result 41

4.4.1 Project result 42

4.4.2 Power meter result 46

4.4.3 Different project and power meter analyzer 46

4.5 Summary 53

CHAPTER 5 CONCLUSION 54

5.1 Introduction 54

5.2 Future recommendation 54

5.3 Result 55

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REFERENCES **56**

APPENDIX **58**

Appendix 1 58

Appendix 2 67

Appendix 3 71

Appendix 4 74

Appendix 5 77

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LIST OF TABLES

TABLE	TITLE	PAGE
Table 4.1	Result from project	42
Table 4.2	Result from power meter	46
Table 4.3	Filament bulb load	46
Table 4.4	Filament LED bulb load	47
Table 4.5	LED bulb load	47

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LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 2.1:	Phase between voltage and current	6
Figure 2.2:	Power triangle	8
Figure 2.3:	Current and volatge angle	10
Figure 2.4:	Capacitor bank	13
Figure 2.5:	Capacitor connection star and delta	14
Figure 2.6:	Synchronous Condenser Connection	15
Figure 2.7:	Capacitor configuration	18
Figure 2.8:	External fused capacitor bank	19
Figure 2.9:	Internal fuse capacitor bank	20
Figure 2.10:	Fuseless capacitor bank	21
Figure 2.11:	Capacitor Bank Correction Table	22
Figure 2.12:	TNB surcharge PF under 0.85	23

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Figure 3.1: Flow Chart 25

Figure 3.2: Arduino Uno 27

Figure 3.3: LCD 16x2 28

Figure 3.4: Pzem-004T 29

Figure 3.5: Ardunio coding 1 31

Figure 3.6: Arduino coding 2 32

Figure 3.7: LCD connection 33

Figure 3.8: Pzem-004T Connection 34

Figure 3.9: Full Circuit with Load 35

Figure 3.10: Real Project Setup 36

Figure 4.1 Full project 40

Figure 4.2 Graph for current 43

Figure 4.3 Graph for power factor 44

Figure 4.4 Graph for power factor vs capacitor 45

Figure 4.5 Current reading different 48

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Figure 4.6	Voltage reading different	48
Figure 4.7	Power factor reading different	49
Figure 4.8	Filament bulb design	51
Figure 4.9	Filament LED bulb design	52
Figure 4.10	LED bulb design	52

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LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix 1	Arduino UNO Configuration	58
Appendix 2	PZEM-004T	67
Appendix 3	LCD 16X2	71
Appendix 4	I2C MODULE	74
Appendix 5	Full project	77

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LIST OF SYMBOLS

V	-	Voltage
I	-	Current
R		Resistance
W		Power
KW		Kilo watt

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LIST OF ABBREVIATIONS

P.f	Power factor
IDE	Intergrated development enviroment

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CHAPTER 1

INTRODUCTION

1.1 Background

The meaning of power factor is ratioin between of the true power(kW) to the total power(kVA) consumed by anything use the a.c electrical equipment or anything of complete electrical installation. This is a measurement ration of how the efficiently the work output when electrical electrical output is converted to useful energy power. The perfect and ideal power factor value is one or unity but if anything less than that means the power supply need extra power to consume the equipment to achieve one or unity or nearest of these.

The power supply and distribution system cause losses in all the current flow. The most efficient loading of the supply is when a load with a power factor of one. When the load makes the power factor of 0.8, will makes the the consumer get the higher looses in the supply system and also make bill increased. In other term, when make even small improvement in power factor able to make reduction in power losses.

The reative power also known as 'missing power' when the power factor is less than one. By the way, to perform the desire fucntion, magnetism field is needed by the the operation of motors and also others inductive loads. Wattless, magnetising or wasted power also known as reactive power.

A poor power factor normally based on the significant phase angle different between the voltage and current at terminal load or also can be by the harmonic of the current waveform. Another cause of poor power factor is usually by the inductive load such as an induction motor, a ballast in the luminair, a power transformer, a welding set, a home heater,

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