

**WIRELESS POWER TRANSFER WITH
MULTILEVEL OUTPUT VOLTAGE**

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of the Bachelor Degree of Electrical Engineering (Hons.) (Power System)

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I hereby declare that the work in this thesis is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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Faculty of Electrical & Electronics Engineering

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DECEMBER 2016

ACKNOWLEDGEMENT

Within the name of Allah S.W.T, probably the most gracious and merciful. I want to thank to my project supervisor, Encik Mohd Shafie Bin Bakar for his steerage and aid in an effort to finishing my ultimate year project. His knowledge and suggestions helped me rather a lot. This undertaking may not be ready to be successful without his help and steerage.

Sincerely from my deep heart, thanks to my family especially my parent because they are always give me supports during my hard time. I would like to thank to all my family members who always give me the encouragement and their faith on me throughout my studies in University Malaysia Pahang (UMP). I may not be able to stand still until the end without their endless support

Special thanks to all my friends, FKEE and UMP staff who has given me a marvelous help in order to completing this project. May Allah repay all your kindness. Thank You.

TABLE OF CONTENT

DECLARATION	
TITLE PAGE	i
ACKNOWLEDGEMENT	ii
ABSTRAK	iii
ABSTRACT	iv
TABLE OF CONTENT	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF SYMBOLS	ix
LIST OF ABBREVIATION	x
CHAPTER 1 INTRODUCTION	1
1.1 INTRODUCTION	1
1.2 PROBLEM STATEMENT	2
1.3 PROJECT OBJECTIVE	3
1.4 PROJECT SCOPE	3
1.5 PROJECT OUTLINE	4
CHAPTER 2 LITERATURE REVIEW	5
2.1 TYPE OF WIRELESS POWER TRANSFER	5
2.2 NEAR FIELD WIRELESS POWER TRANSFER	6
2.2.1 Capacitive Power Transfer (CPT)	6
2.2.2 Inductive Power Transfer (IPT)	6

2.3	FAR FIELD WIRELESS POWER TRANSFER	8
2.4	APPLICATION OF WIRELESS POWER TRANSFER	9
CHAPTER 3 METHODOLOGY		11
3.1	INTRODUCTION	11
	3.1.1 Project Flow Chart	11
3.2	CIRCUIT CONSTRUCTION	13
3.3	COMPONENTS IN CIRCUIT	15
CHAPTER 4 RESULTS & DISCUSSION		25
4.1	TRANSMITTER CIRCUIT	25
4.2	RECEIVER CIRCUIT	26
4.3	Experimental Result	27
4.4	DISTURBANCE BETWEEN TRANSMITTER AND RECEIVER	31
CHAPTER 5 CONCLUSION AND RECOMMENDATION		33
5.1	CONCLUSION	33
5.2	RECOMMENDATION	34
REFERENCES		35
APPENDIX A SAMPLE APPENDIX 1		37

LIST OF TABLES

Table 3.1 Transmitter Parameters	14
Table 3.2 Receiver Parameters	14

LIST OF FIGURES

Figure 1.1 WPT Concept	1
Figure 2.1 The Type of Wireless Power Transfer	5
Figure 2.2 Topology of CPT System	6
Figure 2.3 Topology of IPT System	7
Figure 2.4 Inductive Coupling Block Diagram	7
Figure 2.5 Resonance Inductive Coupling Block Diagram	8
Figure 2.6 Energy Transfer Through Microwave.	9
Figure 2.7 Charging for electric car	10
Figure 3.1 Project Flow Chart	12
Figure 3.2 Transmitter Schematic Diagram	13
Figure 3.3 Receiver Schematic Diagram	14
Figure 3.4 WPT Block Diagram	15
Figure 3.5 DC Power Supply	16
Figure 3.6 Enameled Copper Wire, Electromagnetic Coils	17
Figure 3.7 Voltage Regulator	18
Figure 3.8 Capacitor	19
Figure 3.9 Light-Emitting Diode Construction	20
Figure 3.10 Light-Emitting Diode	21
Figure 3.11 IN4007 Diode	21
Figure 3.12 Resistor	23
Figure 3.13 MOSFET IRFZ44	24
Figure 4.1 Transmitter Circuit	26
Figure 4.2 Receiver Circuit	27
Figure 4.3 Graph Gain for $1k\Omega$ based on Different Voltages Input	28
Figure 4.4 Graph Gain for 330Ω based on Different Voltage Input	28
Figure 4.5 Graph Efficiency for $1k\Omega$ based on Different Voltages Input	29
Figure 4.6 Graph Efficiency for 330Ω based on Different Voltages Input	29
Figure 4.7 Graph V_{ds} based on Different Voltages Input	30
Figure 4.8 Disturbance Between Transmitter and Receiver	31
Figure 4.9 No Disturbance Block Between Transmitter and Receiver	32

LIST OF SYMBOLS

D	Distance
L	Inductance
C	Capacitance
Q_{factor}	Quality Factor
f	Frequency
R	Resistance
F	Farad
V	Volt
W	Meaning
Ω	Ohm
N	Number Of Turns
μ_o	Absolute Permeability Constant
μ_r	Relative Permeability
A	Winding For The Surface
l	Effective Distance of Magnetic Field
d	Diameter Of The Coil

LIST OF ABBREVIATION

WPT	Wireless Power Transfer
AC	Alternative Current
DC	Direct Current
PCB	Printed Circuit Board
CPT	Capacitive Power Transfer
IPT	Inductive Power Transfer
IDT	Integrated Device Technology
RFID	Radio Frequency Identification
MPT	Microwave Power Transfer
LED	Light-emitting Diode

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ABSTRAK

Pemindahan kuasa tanpa wayar (WPT) adalah untuk membangunkan salah satu alat untuk pemindahan kuasa tanpa wayar. Dalam projek ini pemindahan tenaga tanpa wayar dengan voltan keluaran berbeza telah dibina. Keluaran voltan dari projek ini adalah 12V dan 5V. Biasanya, kebanyakan peralatan di rumah memerlukan kabel untuk memindahkan tenaga elektrik dengan voltan yang berbeza dari sumber kuasa. Lebih banyak peralatan yang digunakan, lebih banyak kabel yang diperlukan. Kabel mempunyai risiko tinggi untuk mengalami kerosakkan atau longgar dan ia mudah terdedah kepada lintar pintas atau kebakaran kerana mereka tidak kemas dan tidak teratur. Jadi, jumlah kabel yang digunakan perlu dikurangkan untuk mengelakkan risiko berbahaya ini berlaku. Untuk mengatasi masalah ini, pemindahan tenaga tanpa wayar perlu dibangunkan dengan menggunakan konsep elektromagnet jenis metodologi bulatan. Terdapat jarak tertentu bahawa kuasa boleh memindahkan dengan cekap. Hasil daripada projek ini, terdapat pelbagai jenis graf dengan menggunakan perintang yang berbeza, $1k\Omega$ dan 330Ω pada jarak yang berbeza. tertentu (gain) adalah berbeza daripada $1k\Omega$ dan 330Ω dengan menggunakan perintang yang berbeza. Ia direkodkan oleh perintang kedua-dua menunjukkan keuntungan yang rendah apabila jarak penerima berada jauh dari pemancar. kecekapan juga ditunjukkan nilai yang berbeza apabila jarak jauh. kecekapan adalah kurang daripada 1%. Jarak yang digunakan dalam projek ini adalah 0 cm ke 3cm. Jadi, jarak memberi projek ini memberi kesan kepada hasil keluaran yang 5V dan 12V untuk menyalakan LED light. The bahagian penting dalam projek ini adalah untuk mencapai voltan output multilevel WPT yang hendak dipindahkan.

ABSTRACT

This wireless power transfer (WPT) is to develop one of the tools for power transfer through wireless. In this project wireless power transfer with multilevel output voltage was built. The output from this project is 12V and 5V. Normally, most of the appliances in home need the cables to transfer the electrical energy with different voltages from power source. The more appliances used, the more cables needed. The cables have high risk to damage or loosened and can expose into electrical short or maybe fire because they are not tidy and messy. So, the numbers of cables used should be minimized to avoid the dangerous risk. To overcome this problem, wireless power transfer should be developed by using concept of electromagnetic methodology circle type. There are certain ranges that power can be transfer efficiently. As a result from this project, there are different types of graph by using different resistor which is $1\text{ k}\Omega$ and $330\ \Omega$ at a certain distance. The gains are different from $1\text{ k}\Omega$ and $330\ \Omega$ by using different resistor. It recorded by the both resistor shown the low gain when the distance of receiver are far away from transmitter. The efficiency also shown the different value when the distance far away. The efficiency is less than 1 %. The distance used in this project is 0 cm to 3 cm. So, the distance of this project give affects to the output result which is 5 V and 12 V to light the LED light. The important part of this project is to achieve multilevel output voltages of WPT to be transferred.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Recently, interest in wireless power transfer (WPT) technology has been growing substantially [1]. This technology can be applied to charge or power electronic devices wirelessly. WPT is the way to transfer energy from power source to the electrical shipment without interconnecting to any connectors [2]. The losses of power provided is almost zero. There are two cases of receiving set power transferee, far and near field vigour transfer by inductive power transfer (IPT). The inductive ability transfer of training involves the transmission of energy to the shipment from a major power source and it passing through air break without any connector [3]. The basic precept of WPT consist two coils, that it receiver and transmitter coil [2]. When the alternating current (AC) energized, the magnetic field will generate by transmitter. Then, the current at the receiver coil will induce.

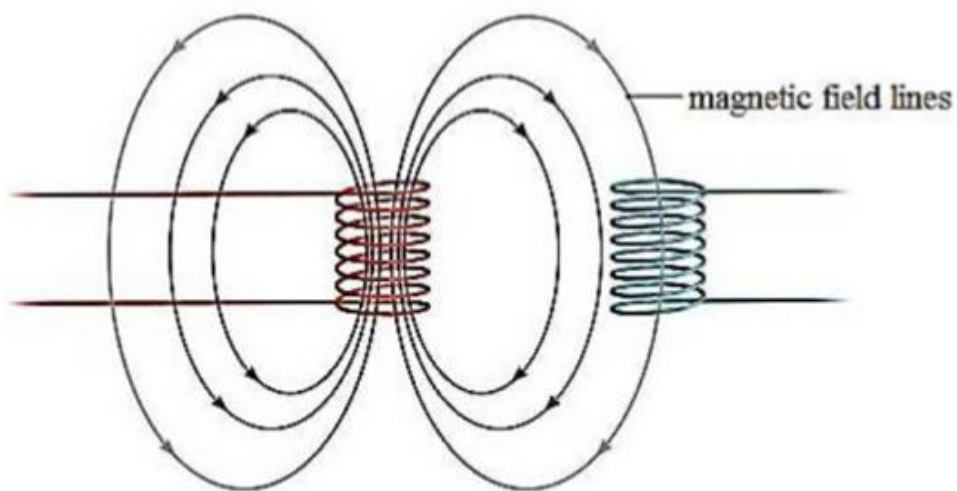


Figure 1.1 WPT Concept

1.2 PROBLEM STATEMENT

In this project, there are some problems that are detected, this can be seen most of today's electronic devices such as cell phones and laptops are using the portability, respect and shall have the ability to communicate wireless. However, these devices still require energy from the wall socket outlet for maintaining electricity.

The second problem identified is the high cost of wiring and maintenance process. Hence, the use of wireless energy transfer model is the wiring system in your home or office can reduce it use. Concept of the wireless transfer of power is a concept with efficient use of practice range far and just produce a very low amount of power.

The third problem identified is having necessity of having portable multilevel voltages devices in our daily life. As we know, more appliances today need a multifunctional usage to get a better life. So, the built of WPT with multilevel output voltages will reduce consumer problems. The multi voltages can helps consumer use it without need any wires cable to connect the appliances they use The WPT with multilevel output voltages can give a different voltages at any different appliances.

Finally, this project is important to communicate and raise awareness and understanding of the concept of knowledge in wireless power transfer to the community and the world about the appropriate use of this technology is updated from time to time.

1.3 PROJECT OBJECTIVE

- i. To evaluate wireless power transfer performance such as gain and efficiency.
- ii. To implement the common electronic devices WPT using electromagnetic coupling methodology with different multilevel voltages for 5 V and 12 V.

1.4 PROJECT SCOPE

- i. Construct the transmitter and receiver circuit 5V and 12V.
- ii. Limitation of devices by using 11 and 9 turn of coils.

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