



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**AUTOMATIC DOOR FOR BIRD HOUSE USING HYBRID POWER
SUPPLY**

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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FACULTY OF ENGINEERING TECHNOLOGY

2019

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: AUTOMATIC DOOR FOR BIRD HOUSE USING HYBRID POWER SUPPLY

Sesi Pengajian: 2019

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APPROVAL

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

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ABSTRAK

Projek ini adalah mengenai reka bentuk, mendapatkan bahan dan komponen yang betul, pembinaan, dan ujian dan penilaian pintu rumah burung automatik. Parameter untuk projek ini termasuk pemasangan mudah pada pintu yang sedia ada, reka bentuk yang ramping, dan boleh membuka pintu pada waktu pagi dan menutup pintu pada waktu malam dengan bantuan pemasa. Bekalan kuasa 12VDC, geganti saluran DPDT, panel solar 10 watt 12V, pengawal cas solar, 12VDC bateri, motor tingkap kuasa 12V, suis dan dua pemasa 12VDC yang boleh diprogramkan akan digunakan dalam projek ini untuk berfungsi dengan baik. Pintu rumah burung automatik mempunyai kelebihan berbanding dengan pintu manual untuk rumah burung kerana ia boleh membuka dan menutup secara automatik dengan sendirinya dan dapat menjimatkan lebih banyak masa untuk kita daripada pergi ke sana untuk membuka dan menutup pintu setiap hari. Pintu boleh diangkat dan ditutup oleh motor tingkap kuasa yang diaktifkan oleh pemasa dan boleh dikendalikan dengan menggunakan bekalan kuasa dua yang merupakan bekalan utama dan bekalan tenaga solar.

ABSTRACT

This project is about the design, getting correct materials and components, construction, and testing and evaluation of an automated bird house door. The parameters for this project include easy installation on existing door, sleek design, and can open the door in the morning and close the door in the night with the help of timer. A 12VDC power supply, DPDT relays, 12V 10 watt solar panel, solar charge controller, 12V rechargeable battery, 12VDC power window motor, 2 limit switch, push button, 12VDC automatic power switching module and two 12VDC programmable timer will used in this project for the door to function properly. The automated bird house door has the advantage is compared to manual door for bird house because it can automatic open and close by itself and can save more time for us rather than going there to open and close the door everyday. The door can be lifted and closed by power window motor which is activated by a timer and can be operated by using dual power supply which is the main supply and solar power supply.

DEDICATION

Firstly, I would like to dedicate my thesis to Father's God, Lord for blessings and love. Additionally, I would like to dedicate to my parents, who support and inspire me and guide me throughout my growth. Here by, I would like to dedicate to my supervisor, Mr Ramlan Bin Latip who always supported me, gave me ideas, encouraged me with my opinion, listened to my problems, taught me to be a better man who was responsible for work and always ready to lend to my hand. Finally, I dedicate to all my friends who support and encourage me until the end of my project, I will always appreciate them all.

ACKNOWLEDGEMENT

I would like to take this opportunity to thank my supervisor, Mr. Ramlan Bin Latip, who guided me throughout the project, taught me and gave me advice. Without his guidance and continuous help, this project will not succeed. I would also like to take this opportunity to thank my parents for their spiritual and financial support and encouragement and support. I also have the responsibility to express my gratitude to my friends, who gave advice on some aspects and helped me with the project. Finally, I also take this opportunity who help me with this and all direct or indirect gratitude in this project.

TABLE OF CONTENT

	PAGE
ABSTRAK	V
ABSTRACT	VI
DEDICATION	VII
ACKNOWLEDGEMENT	VIII
TABLE OF CONTENT	IX
LIST OF TABLES	XIII
LIST OF FIGURES	XIV
LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURES	XVI
 CHAPTER 1: INTRODUCTION	
1.1 Research background	1
1.2 Problem statement	2
1.3 Aim	2
1.4 Research Objective	2
1.5 Research Methodology	3
1.6 System Deliverables	3

CHAPTER 2: LITERATURE REVIEW

2.1	Introduction	4
2.2	Solar Panel	4
2.2.1	Monocrystalline Solar Panel	5
2.2.2	Thin-film Solar Cell (TFSC)	6
2.2.3	Polycrystalline Solar Panel	7
2.3	Relay	8
2.3.1	Working Principal Of Relay	9
2.3.2	Pole and Throw on the Relay	10
2.4	Power Motor Window	11
2.6	Timer	12
2.6.1	Mechanical Analog Timer	13
2.6.2	Programmable Digital Timer	14
2.7	AC/DC Converter	15
2.8	Limit Switch	16
2.9	Automatic Power Switching Module	17

CHAPTER 3: PROJECT METHODOLOGY

3.1	Introduction	18
3.2	Methodology Of The Project	18
3.3	Flow Chart Of The Project	19
3.4	Overview Of The Project	20

3.5	Hardware Development	21
3.6	Electrical Components	22
3.6.1	Solar Panel (12V/10W)	23
3.6.2	Rechargeable Battery (12V/7.2Ah)	24
3.6.3	Power Window Motor (12VDC)	25
3.6.4	Automatic Power Switching Module (12V/DC, 10A)	26
3.7	Electrical Circuit	27
3.8	Project Testing And Setup	28
3.8.1	Testing The Solar Panel And Battery	28
3.8.2	Testing The Power Window Motor And Limit Switch	29
3.8.3	Testing Overall Design	30
3.8.4	Project Setup	31

CHAPTER 4: RESULT AND DISCUSSION

4.0	Introduction	32
4.1	Result	32
4.2	Analysis	36
4.3	Discussion	40

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.0	Introduction	41
5.1	Conclusion	41
5.2	Recommendation	42

REFERENCES

43

APPENDICES

45

LIST OF TABLES

	PAGE
Table 3.1: Electrical Components	22
Table 3.2: Solar Panel Specification	23
Table 3.3: 12V Rechargeable Battery Specification	24
Table 3.4: Power Motor Window Specification	25
Table 3.5: Automatic Switching Power Module Specification	26
Table 4.1: Testing of timer on and off	32
Table 4.2: Testing of opening and closing of door	34

LIST OF FIGURES

	PAGE
Figure 2.1: Monocrystalline Solar Panel	5
Figure 2.2: Thin-film solar cell	6
Figure 2.3: Polycrystalline solar panel	7
Figure 2.4: Relay	8
Figure 2.5: Working Principal Of Relay	9
Figure 2.6: Type of relay based on pole and throw	10
Figure 2.7: Power Motor Window	11
Figure 2.8: Mechanical Analog Timer	13
Figure 2.9: Programmable Digital Timer	14
Figure 2.10: Alternating Current To Direct Current Converter	15
Figure 2.11: Limit Switch	16
Figure 2.12: Automatic Power Switching Module	17
Figure 2.13: Connection of Automatic Power Switching Module	17
Figure 3.1: Flow Chart of the Project	19
Figure 3.2: Block Diagram Of The Project	20
Figure 3.3: Main Frame and Spacers	21
Figure 3.4: Door Plate	21
Figure 3.5: 12V/10W Solar Panel	23

Figure 3.6:	12V/7.0AH Rechargeable Battery	24
Figure 3.7:	12VDC Power Motor Window	25
Figure 3.8:	Automatic Power Switching Module	26
Figure 3.9:	Electrical Circuit	27
Figure 3.10:	Solar panel recharge battery	28
Figure 3.11:	Testing of limit switch and power window motor	29
Figure 3.12:	Testing overall project design	30
Figure 3.13:	Project setup layout	31
Figure 4.1 :	Timer turn on while one or both supply is turn on	33
Figure 4.2 :	Timer turn off when both supply is turn off	33
Figure 4.3 :	The door close at night	35
Figure 4.4 :	The door open in morning	35

LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURES

<	-	Less Than
~	-	Similar to
DC	-	Direct Current
AC	-	Alternating Current
AH	-	Ampere Hour
Hz	-	Hertz
V	-	Voltage
A	-	Ampere
W	-	Watt
%	-	Percentage
NO	-	Normally Open
NC	-	Normally Close
LCD	-	Liquid Crystal Display
LED	-	Light Emitting Diode
°C	-	Degree Celsius
mm	-	Millimeter
kg	-	Kilogram
*	-	Multiplication

L	-	Length
W	-	Wide
H	-	Height
P	-	Power
I	-	Current
Q	-	Charge in coulombs
C	-	Capacity in amp-hours
x	-	Current drawn in amps
RPM	-	Revolutions Per Minute
KGF/CM	-	Kilogram Force Per Centimeter

CHAPTER 1

INTRODUCTION

1.1 Research Background

At night, birds are being attacked by many predators. People encounter problems with allowing bird to be free range. It makes them prime targets for predators, which can result in many deaths among the flock. Even when housed in a structure, there is still a threat of predators. Many structure use door as a means of protection, but it does not prevent predators, such as hawks, or owls, from attempting to reach in and eat all the birds.

To ensure that our birds are safe and alive, a good solution is to have a closed structure that allows birds to fly at night and fly out during the day instead of closing them in the structure every night. Or let them fly out early in the morning. A good solution is to install an automatic door on the bird house. Doors can be designed to include many different functions. These functions will cover how the door is opened and closed, and how the door is set to open and close.

In the case of a fail-safe door, it will automatically open and close to allow birds to roam the pasture during the day and safely avoid the predator at night. This door will avoid the huge risk of predators roaming the pasture in the dark. The farmer will increase the productivity of birds to make edible bird's nests and reduce the cost of birds losing from being eaten by predators.

This project will focus on design an automatic door for bird house using hybrid power supply which include the main supply and battery as backup supply which is charged by using solar power.

1.2 Problem Statement

Birds are being attacked by many predators. To ensure that our birds are safe and alive, a good solution is to have a closed structure that allows birds to fly at night and fly out during the day instead of having to open and close the door of the structure every morning and night. Or let them fly out early in the morning. Most of the automatic door in bird house does not have backup supply, so if something happen to the main supply, the door will not function. A good solution is to install an automatic door on the bird house with dual power supply. Doors can be designed to include many different functions. These functions will cover how the door is opened and closed, how the door is set to open and close and how the door function all the times by using dual power supply This project is expected to overcome the problem by design an automatic door for bird house using hybrid power supply.

1.3 Aim

To design an automatic door for bird house using dual power supply which include main supply and solar power system as backup supply.

1.4 Research Objectives

The objectives of this project are as follows:

1. To develop an automatic door for the bird house.
2. To develop the hybrid power supply for automatic door of the bird house.

1.5 Research Methodology

There are very few method and step used in this project. The first step is to determine the door design. The structural setup of the installed door will take into account various designs. Designing the door should be able to open in the morning at the scheduled time and close at the appointed time in the evening. The door handle opens and closes in the same way that the electric window motor operates. The electric window motor can be lifted and closed by being mounted at a fixed position on the door. When the motor starts, the door will moves up and down.

The second step is to design the door frame. The door must be large enough so that all birds can fly over it. There are strength, durability, and aesthetic pleasure in the type of material chosen to design an automatic door main frame. So I decided to make a main frame with a recycled wood board. Using this material, the door is very durable and resistant to predators. The mainframe consists of two parts, a central frame connected to the front panel and a detachable back panel.

The third step is to get the right materials and components to open and close the door at a given time, and the circuit must be designed and connected to the motor. I will be using a 12V DC power supply, dual channel relay, 12V 10W solar panel, solar charge controller, 12V battery, 12V power window motor, switch and two 12VDC programmable timers. The relay determines the direction in which the motor will rotate when the timer is turned on or off.

1.6 System Deliverables

This project will design an automatic door for bird house using hybrid power supply. The door is lifted and closed by power window motor which is activated by a timer and can be operated by using dual power supply. The construction of the design will be tested and evaluated in discussion.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the literature review of the project, including not only all assumptions related to research, but also the concepts, theories, perspectives and methods of the project to solve the problem. The main purpose of this chapter is to provide readers with in-depth understanding of previous research and technical information about the above technologies.

2.2 Solar panel

Solar energy is a technology created to gain energy from sunlight. This solar energy has been used in many traditional technologies over the last few centuries. Alexandre Edmond Becquerel discovered the photovoltaic effect which explains how electricity can be generated from sunlight in 1839. Some examples of solar energy use are water heating, heating and cooking. In fact, solar energy can also produce electricity through the heating engine. Through the latest technology, the production of solar panels can produce electricity everyday. Now, there are many homes, factories and industries that install solar panels to produce electricity either for business purposes or for their own use.

There are three type of solar panel:

- 1) Monocrystalline solar panel
- 2) Thin-film solar cell (TFSC)
- 3) Polycrystalline solar panel

2.2.1 Monocrystalline solar panel

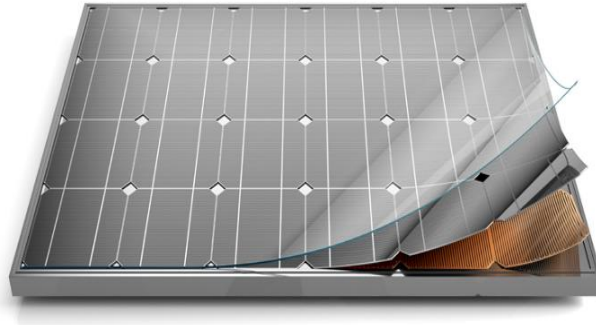


Figure 2.1: Monocrystalline Solar Panel

This type of monocrystalline solar panel is made with silicon which is formed into bars and sliced. This type of panel is commonly called "monocrystalline" to prove that the silicon used is monocrystalline silicon. Because cells are made of single crystals, the electrons that produce electricity have more room to flow. Therefore, monocrystalline panels are more efficient than polycrystalline.

Advantage:

- a) Highest efficiency
- b) Long lifespan.
- c) Has a high temperature tolerance.

Disadvantage:

- a) Expensive
- b) Less efficient in cloudy weather
- c) Circuit will break down if covered with dirt.

2.2.2 Thin-film solar cell

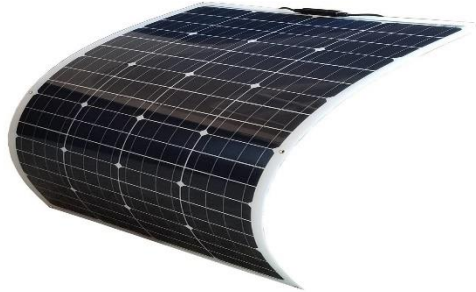


Figure 2.2: Thin-film solar cell

This type of solar panel is made by adding thin solar cells to a base layer. Because the shape of TFSC is thin, so these solar panels are very light and flexible. The thickness of the layers can be measured from nanometers to micrometers. The thin film solar cells are classified into four types that are amorphous silicon, Cadmium telluride, Copper indium gallium selenide panels and Organic thin film solar cells.

Advantage:

- a) More flexible
- b) Easy to handle
- c) Cheaper than traditional panels

Disadvantage:

- a) Less efficiency
- b) Easy to break because it is thin