

# INTELLIGENT HAND WASHER

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**  
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

**BORANG PENGESAHAN STATUS LAPORAN  
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Special dedication to my loving family, all my siblings, and my kind hearted supervisor  
Mr. Azman Bin Awang Teh and also dearest friends.

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## ABSTRACT

Water is some sort of precious supply which was given by god to us. Peoples used the water supply for daily usage such as for bathing, cooking, washing and others. Washing hands is also parts of people daily usage to keep their life hygienic. This thesis is concentrating on the automatic system for hand washing, which help to prevent wastage of water and detergent. This project designate to overcome the water wasting problems but with its special ability which is efficient. ‘Intelligent Hand Washer’ (IHW-08) is a project that contain three major section/work and fully controlled by PLC. Three major section/work is water, detergent and dryer. The basic operation of this system is PLC will receive instruction from the sensor under the pipe and will activate valve for the water and the detergent. Lastly, the system will activate the dryer. It will function sequentially and automatically which helps to reduce the wastage of water and detergent.

## ABSTRAK

‘Intelligent Hand Washer’ direka bertujuan membina sebuah sistem kawalan automatik untuk membasuh tangan. Sistem ini merupakan sebuah sistem yang sepenuhnya dikawal oleh satu otak atau kawalan utama menggunakan Programmable logic Controller (PLC). Sistem ini direka bertujuan untuk mengelakan pembaziran air khususnya di tempat-tempat awam. Sistem ini terdiri daripada tiga bahagian penting iaitu air, sabun dan pengering. Sistem ini akan melakukan tiga kerja berlainan mengikut turutan. Langkah pertama, proses menyabun di mana sabun akan dikeluarkan melalui tap air setelah litar infra red memantukan isyarat lalu menggerakkan sistem. Langkah kedua, air akan keluar melalui tap air untuk proses membilas. Akhir sekali, pengering akan beroperasi untuk proses pengeringan. Semua ini akan beroperasi secara automatik yg dikawal oleh PLC. Sensor IR merupakan suis yg akan menaktifkan keseluruhan system. Objektif utama penghasilan projek ini adalah untuk membina satu sistem dimana boleh melakukan semua proses membasuh tangan iaitu menyabun tangan , membilas serta mengeringkan tangan.



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## LIST OF ABBREVIATIONS

PLC	-	Programmable Logic Controller
CPU	-	Central Processing Unit
PCB	-	Printed Circuit Board

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Project Overview**

Water is some sort of precious supply which was given by god to us. Peoples used the water supply for daily usage such as for bathing, cooking, washing and others. Washing hands is also parts of people daily usage to keep their life hygienic.

This thesis is concentrating on the automatic system for hand washing, which help to prevent wastage of water and detergent. This project designate to overcome the water wasting problems but with its special ability which is efficient. The design is using simple piping system for water flow from the main supply into the system. The piping system for the system is modified to join the water and detergent flow following the specification that been finalize. Lastly, the dryer joined into the system to make complete automatic system. This system contains three different elements which are automatic water flow, automatic detergent and automatic hand dryer which fully control by PLC. For water and detergent flow, valve is used as a control element to operate sequentially that would be control by the PLC. The after the rinsing process the dryer will operate automatically following the specification.

Intelligent Hand Washer ( IHW-08 ) is a project that contain three major section/work and fully controlled by PLC. Three major section/work is water, detergent and dryer. The basic operation of this system is PLC will receive

instruction from the sensor under the pipe and will activate valve for the water and the detergent. Lastly, the system will activate the dryer. It will function sequentially and automatically which helps to reduce the wastage of water and detergent. The figure below show the illustrated how the system plans to work by itself or automatically. This machine, which can bring peoples to a new era, that is modern and sophisticated. This is because this machine uses system which is 100% automatic. This machine can be used anywhere such as in restaurant, public toilet, resting area and others.



1

2

3

*Figure 1.1: 1) Automatic Dispense Detergent, 2) Rinsing stage, 3) Dryer Stage [1]*

## 1.2 Project Objective

The objective of project is to make sure that the project following on the right plan and what the project really want to achieves. Besides than it also to ensure the positive progress of the development system and also to ensure that the main objective will be realized. Below are the objectives of the project:

- To create new technology.
- To get to know and learnt the operation of certain circuit such as the control circuit.
- To create a product which have a commercial value.
- To reduce the wastage of water and detergent.
- Programmers Logic Control is equipment which is very useful and complicated. Getting a chance to use the equipment is an advantage and a great opportunity for us.
- To simplify human life by upgrading the way of cleaning their hands hygienically.

## 1.3 Problem Statement

The usage of this product is to promote hygienic lifestyle especially for Malaysian citizen. Sometimes, people do not realize that they actually didn't wash their hand properly and with this product help them to wash it properly. Besides that, it will produce new technology which will help prevent the wastage of water. Lastly, this product is efficient and easy to use for all users.

## 1.4 Scope of Work

The scope of this project is to design an automated system for hand washing with care and cleanly to overcome the wastage of water and detergent. Below are the scopes of the project:

### **1.4.1 Study and Research**

Get as many as information about this project from books, internet, journal, and supervisor and also from products that sold at the market so that more knowledge can be known about this project. These findings also include the hardware and software that used to produce the project following the specification.

### **1.4.2 Design and construct the programming**

PLC (Programmable Logic Controller) is used as a main controller. To program the PLC first the ladder diagram were designed using Grafcet Method then constructed and run the simulation using CX-Programmer.

### **1.4.3 Hardware Design and Equipments**

The circuit designing and constructing process is done using P-Spice Software. P-Spice is a SPICE analog circuit and digital logic simulation software that runs on personal computers which help student to make sure the circuit run before it been transferred to PCB. Beside PLC, there is other particular devices use to produce this project such as valve (240V), liquid pump, and IR sensor (receiver and transmitter).

### **1.4.4 Finishing**

The finishing part is to combined hardware and software in creating an automatic system. In other words, the programmed PLC will communicate with other hardware to work as a complete system.