HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A SEQUENCE CONTROL SCHEME OF A POLISHING MACHINE USING PROGRAMMABLE LOGIC CONTROLLER

E/1208

BY
ANASTASIOU THALIS

JUNE 2000

HIGHER TECHNICAL INSTITUTE
PROJECT NO.
3120

SUMMARY

"Development of a sequence control scheme of a Polishing machine using Programmable Logic Controller"

By

Anastasiou Thalis

This project provides a Programmable Logic Controller ladder program in order to control an automatic Polishing machine.

The first chapter is an introduction to PLCs and gives important information about the evolution to the present PLCs in addition to their major advantages over the other conventional methods.

The second chapter describes the major parts of the PLCs. The third chapter explains the ladder diagram language and the forth chapter the standard PLC functions.

The chapter five provides the ladder diagram program of the polishing machine and a description of the program is given on chapter six. Finally the implementation of PLC is proved as the best solution for this control system in the last two chapters.

CONTENTS

	PAGES
Acknowledgement	1
Summary	2
Introduction	3
Chapter 1 Introduction to PLCs	4
1.0 Introduction	5
1.1 Definition of a PLC	5
1.2 PLC History	6
1.3 Comparison with relay control systems	7
1.4 Comparison with various control systems	11
Chapter 2 PLC Architecture	12
2.0 Introduction	13
2.1 The major parts of a PLC	13
2.2 The CPU	14
2.3 Power Supply	17
2.4 The Programmer/Monitor (PM)	19
2.5 I/O Modules	20
2.6 Printer	23
2.7 The Programmer Record/Player	23
Chapter 3 Ladder Diagram Language	25
3.0 Introduction	26
3.1 Ladder Diagram Programming	26
3.2 Logical Continuity	27

3.3 Memory Organization 28
3.4 Addressing 30
3.5 Operating Cycle 33

Chapter 4 Basic PLC Functions 34
4.0 Introduction 35
4.1 Relay Logic (Bit) Instructions 35
4.2 Timer and Counter Introductions 38
4.3 Comparison Introductions 42
4.4 Compute and Math Introductions 42
4.5 Move and Logical Introductions 43
4.6 File Copy Introductions 44
4.7 Bit Shift Introductions 44
4.8 Sequencer Introductions 45
4.9 Control Introductions 45
4.10 Advance Introductions 46

Chapter 5 Application Study 47
5.0 Introduction 48
5.1 Procedure Planning Steps 48
5.2 Program Listing 57

Chapter 6 Program Analysis 68
6.0 Introduction 69
6.1 General Explanation 69
6.2 Main Program 69
6.3 Selftest Subroutine File 3 70
6.4 Manual Subroutine File 4 71
6.5 Selftest Errors 72

6.6 Program Explanation 73

Chapter 7 Costing 84

7.0 Introduction 85

7.1 Cost Analysis 85

7.2 Comparison with traditional relay method 87

Conclusions 88

References 90

Appendix 91