

PROJECT REPORT

" DEVELOPMENT OF THE CONTROL SCHEME OF AN EXTRUSION MACHINE USING PROGRAMMABLE CONTROLLERS "

SUBMITTED BY :

PANTELIS A. ANGELIDES

In partial fulfilment of the requirements of the award of the Diploma of the
Technician Engineer in Electrical Engineering of the Higher Technical Institute
of CYPRUS.

PROJECT SUPERVISOR : Mr I. Demetriou Electrical Engineering lecturer
H.T.I

JUNE -1993

H.T.I



ACKNOWLEDGEMENTS

I would like to pay great gratitude to my project supervisor, Mr I. Demetriou and to Mr I. Pampouris, laboratory assistant for their assistance and guidance for the preparation and completion of this project.

I would, also like to express my appreciation and thanks to my uncle Mr Angelos Ionas for his continuous supervision and valuable assistance during the preparation of the project report.

Finally, I would like to thank my family for their encouragement and tolerance, they offered to me throughout my studies.

Pantelis A. Angelides
3rd year student in Electrical Engineering
H.T.I

JUNE 1993.

SUMMARY

TITLE : " Development of the Control Scheme of an Extrusion Machine using Programmable Controllers ".

AUTHOR : Pantelis A. Angelides

The present report investigates the programming capabilities of the Ladder language and examines the characteristics and capabilities of Programmable Controllers. Then an application program is developed, using one of the Programmable Controllers available in H.T.I, for the control of an Extrusion machine. In addition, costing is made and helpful data sheets are submitted.

The development of the application program is planned for the SLC 500 of ALLEN BRADLEY PLC and the programming format is based on the manual of the SLC 500 PLC.

The report sticks to basic information concerning the PLC technology; the fact that such technology is not very well known to technical people is taken under consideration and the most basic concepts and features of PLCs are explained in detail.

CONTENTS

	<u>PAGES</u>
Acknowledgements _____	III
Summary _____	IV
Introduction _____	V
<u>CHAPTER 1</u> : Introduction to PLC, _____	1
1.0 Definition	
1.1 History of Allen Bradley PLC	
1.3 Advantages and disadvantages of PLCs	
1.4 Other manufacturer's series of PLCs	
<u>CHAPTER 2</u> : PLC Major Parts and Internal Operation _____	5
2.0 Introduction	
2.1 Major parts of a PLC	
2.2 Central processing unit	
2.3 The Input/Output modules	
2.4 Power supply	
2.5 Other peripherals of PLC	
<u>CHAPTER 3</u> : Ladder language programming _____	13
3.0 Introduction	
3.1 Ladder language characteristics	
3.2 Ladder language instructions	
3.3 Memory organization and addressing	
3.4 Operating cycle	
<u>CHAPTER 4</u> : Basic PLC functions _____	18
4.0 Introduction	
4.1 Timer instruction	
4.2 Counter instruction	
4.3 I/O Update insrtuctions	
4.4 Comparison instructions	
4.5 Compute and math instructions	
4.6 Move and logical instructions	
4.7 File copy and File fill instructions	

4.8 Bit shift instructions	
4.9 Sequencer instructions	
4.10 Control instructions	
CHAPTER 5 : Application case study	24
5.0 Introduction	
5.1 Program planning	
5.2 Address allocation for input, output and timers	
5.3 Input and output status	
CHAPTER 6 : Program analysis	29
6.0 Introduction	
6.1 Program analysis	
CHAPTER 7 : Costing	33
7.0 Introduction	
7.1 Cost analysis	
7.2 Material cost in Cyprus Pounds (CP)	
7.3 Labor cost	
7.4 Overhead expenses	
7.5 Profit	
7.6 VAT	
7.7 Comparison with the conventional method costs	
CONCLUSIONS	VI
<u>APPENDICES:</u>	
<u>APPENDIX 1 : System wiring connections</u>	
<u>APPENDIX 2 : SLC-500 specifications</u>	
<u>APPENDIX 3 : Configuration and programming of PLC</u>	
<u>APPENDIX 4 : Manufacturer's data</u>	
REFERENCES	VII