



FINAL YEAR PROJECT REPORT

**PLC BASED EFFICIENT INDUSTRIAL
AUTOMATED BOILER VIA HMI**

**In fulfillment of the requirement
For degree of
BEE (Electronics)**

By

M.MUBEEN ADNAN ALI	25421 BEE (ELECTRONICS)
MUHAMMAD HASSNAIN	25416 BEE (ELECTRONICS)
MUHAMMAD SAFDAR KAMAL	25429 BEE (ELECTRONICS)

SUPERVISED

BY

ENGR. TAIMOOR ZAFAR

BAHRIA UNIVERSITY (KARACHI CAMPUS)

2015

ACKNOWLEDGEMENTS

We would like to thank everyone who had contributed to the successful completion of this project. We would like to express our gratitude to our research supervisor, Mr Taimoor Zafer for his valuable advices and special thanks to Dr Haroon for being supportive all the time.

In addition, we would also like to express our gratitude to our loving parent and friends who had helped and given us encouragement.

ABSTRACT

Now days, the electronics and industries span around the automation and dehumanizing the human efforts from the field operations. Today most of the devices are performing operations at their own needing less help from human. Engineers are supposed to empower the machines so that machines can take operational decisions, sought out the problem and fix it moreover to perform error diagnosis making a record of operation timings in order to make the future problems encountering much simple and flexible. The project 'PIC based industrial automated boiler via HMI' uses the concepts of automation and it to automate a running system to perform secure operations, implanting the safety peripherals, making the system fault free and proper operation of burner system. The prototype design here in accomplishes the 'DELTA DVP20EX2' for making the operational decisions i.e. checking of false flame, fault lockout, remote reset/enable implementing safety interlocks and error diagnosis etc.

TABLE OF CONTENTS

CHAPTERS

1. Introduction	9
1.1 Need of final year project	9
1.2 Brief Introduction to the problem	9
1.3 Importance of the project	10
1.4 Key features of the project	10
1.5 Achievements	10
2. Background literature	11
2.1 Engineering	11
2.2 Electronic Engineering	11
2.3 Role of computer in Electronics	13
2.4 Embedded system	15
2.5 PLC	17
2.6 HMI	18
3. Aims and objective	19
3.1 Boiler	19
3.2 Boiler configurations	19
3.3 Problem Overview	21
3.4 Possible solutions	23
4. Analysis and design	25
4.1 Block diagram	25
4.2 Selected Mechanical Design	25
4.3 Adopted control strategy	25
4.4 Selected programmable device	26
4.5 Safeties	27
4.6 Implemented control	28
4.7 HMI solution	29
4.8 Implemented Solution for HMI/GUI	30

1. INTRODUCTION

5. Discrete control	31
5.1 Pressure switches	31
5.2 Level Electrodes	32
5.3 Solenoid Valves	32
6. Implementation of HMI/GUI & LADDER DIAGRAM	34
6.1 EASY BUILDER	34
6.2 HMI	34
7. REFERENCES	36
8. APPENDIX	37
8.1 Ladder Diagram	37
8.2 Product Profile and Dimension	38
8.3 Electrical Specification	39
8.4 A/D and D/A Specifications (For EX2 Model Only)	40