

TEMPERATURE CONTROLLER USING PIC

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ABSTRACT

Engineering is concerned with the understanding and controlling the materials and forces of nature for the benefit of mankind. Controllers are devices which create changes, known as system response according to feedback information. Controllers play the critical role of maintaining the desired conditions.

Presented in the project is a simple temperature controller alarm which uses a PIC 16F873 microcontroller and a 2-line LCD display. The LCD displays current temperature, temperature set pointing in Celsius degrees, duration of time in second and alarm displays. Features are a 5-key keypad which allows user to set independent high and low temperature alarm points and time duration also a buzzer to indicate when the controlling is finished.

This project used a PIC to automate the controlling process of heater and fan. A microcontroller is used as it has the advantage of fast design time, no need to design & built interfacing circuits, no compatibility problems, can be interfaced to anything and easy to determined external peripheral timing. The input signals from the sensors (thermostat) are electronically processed and fed into the control system, which determines the action to be taken. An appropriate signal is then given to the actuators, which make the desired changes in the system, such as reducing, maintaining and increasing the heat input also turning on and off the fan. Thermostat control is used in cooling and heating systems to ensure that desired conditions are maintained.

Keywords: Temperature controller; PIC 16F873; LCD display; microcontroller

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Temperature is a measure of the thermal state of matter. The process of controlling temperature is important in food production industry, oven, car paint and hot water shower. This final year project is focusing on the development of hardware and software which cover structure model. To accurately control process temperature without extensive operator involvement, a temperature control system relies upon a controller, which accepts a temperature sensor such as a thermocouple or RTD as input. It compares the actual temperature to the desired control temperature, or set point, and provides an output to a control element. The controller is one part of the entire control system, and the whole system should be analyzed in selecting the proper controller [1].

An on – off controller is the simplest form of temperature control device. The output from the device is either on or off, with no middle state. An on – off controller will switch the output only when the temperature is below the set point, and off above set point [1]. Since the temperature crosses the set point to change the output state, the process temperature will be cycling continually, going from below set point to above, and back below. This project is intended to control a heating system, keeping constant temperature in a furnace.

The project is a simple closed loop control devices. They constantly measure the temperature of a furnace and then adjust it if it is off the user's programmed setting by controlling the heating element. This is the advantage of such system where correction can be made to the system to maintain the desired temperature condition [2].