DESIGN AND CONSTRUCTION OF A HEAT TREATMENT OVEN

A thesis

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Abstract

The **Heat Treatment Oven** utilizing **Solid State Relay (SSR)**, **Thermocouple**, **Nichrome Wire**, **AC 220V Supply**, **Temperature Controller**, and **Bricks** is a highly efficient and precise system designed for various thermal processing applications. The oven relies on nichrome wire for heating, with temperature regulation achieved through a thermocouple and a temperature controller that ensures accurate and stable thermal conditions. Solid-state relays enable fast switching and enhanced reliability, making the oven energy-efficient and low-maintenance. The brick lining provides excellent heat insulation, reducing energy consumption and maintaining consistent temperatures. This setup is suitable for industries such as metalworking, ceramics, and research, where precise temperature control is essential for processes like annealing, hardening, and sintering. The oven operates on a standard AC 220V supply, offering ease of integration into existing systems. Despite its benefits, challenges such as the initial setup cost, complexity, and space requirements need to be considered. Overall, the heat treatment oven is a robust solution for controlled thermal processes, with significant potential for future advancements in automation and energy efficiency.

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