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Single Phase Induction Motor Speed Control Using Thyristor

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Abstract: *Speed control of single-phase induction motors is a critical requirement in many domestic, commercial, and industrial applications. Traditionally, speed control techniquesThe tend to be complex or expensive. In this project, we present a simple, cost-effective method for controlling the speed of a single-phase induction motor using a thyristor-based phase control approach.*

The system utilizes a potentiometer to allow the user to manually set the desired speed level. The analog signal from the potentiometer is read by an Arduino UNO microcontroller, which processes this input and calculates the appropriate firing angle required for the thyristor. The thyristor, functioning as a phase-controlled device, modulates the RMS voltage applied to the motor by delaying the conduction period within each AC cycle, effectively controlling the motor's speed without significant loss of torque.

This project demonstrates a reliable, efficient, and easily implementable solution for variable speed operation of single-phase induction motors using readily available components. It offers significant advantages in terms of simplicity, user control, safety, and cost-effectiveness, making it suitable for educational purposes, small appliances, and adjustable motor-driven systems

Keywords: Speed Control, Arduino UNO, Thyristor, Phase Control, Induction Motor, Power Regulation, Motor Efficiency, IoT Integration

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