

SINGLE PHASE RECTIFIER CONTROLLED USING PIC

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ABSTRACT

This project report presents to design high switching frequency rectifier controlled using PIC. The project will resolve harmonic problem by providing more reduction on harmonic content that created by nonlinear device. PIC acts as the controller to the rectifier. This project is concern on the AC side in term of harmonic. In the proposed work, MOSFET is used as switching device. It is because of it appreciable current carrying, off-state voltage blocking capability and low on-state voltage drop. Other than that, MOSFET require simpler gate requirements and higher positive temperature coefficient. A simple yet effective scheme for improving the power factor and waveshape of input current drawn by a single phase bridge rectifier is presented. A rectifier with filter capacitor draws current from the supply discontinuously, in short pulses. The simulated results reveal that the harmonic content of the scheme presented is few at lower frequency and shifted up to higher frequency.

Keywords: Active Power Filter, Rectifier, Pulse Width Modulation, Peripheral Interface Controller

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In many cases, active switching element has been used for harmonics current filtering. They operate using pulse width modulation (PWM) techniques to inject the required non-sinusoidal current requirements of nonlinear loads. Many studies have been carried out on various aspects of active power filter implementations.

Parallel active power filters (PAF) normally operate using pulse width modulation (PWM) inverter techniques to inject the required non-sinusoidal current requirements of nonlinear load but are complex with the number of switches in use. In this work the principles of high switching technique is proposed, implemented as a new active power filtering technique that could reduce input current distortions when feeding a load.

The proposed system uses only two switch to perform active current wave-shaping. This is done by injecting higher switching frequency to active switching element. The operation of the proposed filter structure is examined with computer simulation verified with selected experiment results.

1.2 OBJECTIVE OF PROJECT

The main core of this project is to design a rectifier controlled using microcontroller. This system will be able to control the rectifier to reduce the harmonic content at lower frequency by shift the harmonic to the higher frequency.