

Abstract

Traditionally AC-DC converters are commonly used for providing dc link voltage in high power, medium voltage application like UPS, ASD & SMPS. Till recent past the ac-dc converter technology is dominated by line commutated uncontrolled rectifiers & phase controlled thyristor bridge rectifiers which have some inherent drawback.

However, with the development of power semiconductor device technology, the self commutated devices are evolved & researchers paid their attention to operate these converters with Pulse Width Modulated technique. Meanwhile most of the application requires these converters with fast Digital Signal Processors for real time & dynamic performance.

In the present work, PWM ac-dc voltage source converter with DSP control scheme is preferred for Active Front End converters. The main objectives in the control of PWM ac-dc converters are to achieve high power factor & minimum harmonic distortion in input line currents as per IEEE-519-92 standard.

There are various PWM techniques, which are used for control purpose, have their own merits & demerits. Use of Selected Harmonic Elimination PWM method diminishes the selected harmonics but it will augment the higher order Harmonics & Space Vector Modulation is intricate & expensive. A Modified Sinusoidal Width Modulation reduces cost as well as reaches up to the objective.

In the present work an AFE converter has been introduced which has the property of providing the desired boosted output dc voltage while maintaining the unity power factor condition at the input side. By Modulation Index & Phase shift in Sinusoidal PWM, power factor & voltage regulation of 3- ϕ system can be controlled. Simulated technique is implemented in hardware for UPS & got the results as per theoretical work. Real time software is developed to control the converter structure using TMS320C2407A DSP controller.