

Improving the Power Quality of the Arc Welding Supply using an Active Power Filter

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Abstract : This paper presents a new circuit topology suitable for arc welding inverter applications, this topology is based on a shunt active power filter (APF), in order to improve the power quality and reduce the total harmonic distortion (THD) by consequently improve the power factor (PF), a modified active and reactive power method (p-q), which is combined with a self-tuning filter, is used to identify the harmonics current references of the load current, Also a PI controller has been used to maintain the level of DC-link voltage at a constant value and improves its dynamic response; the voltage source inverter of APF is controlled by hysteresis current controller. The Major favorable features of this topology like fast response to load and source voltage conditions will result in better welding performance. The performance of the entire system is evaluated on the basis of THD of the source current, input power factor, dynamic response, voltage regulation and robustness to prove its effectiveness in terms of excellent power quality.

Keywords : arc welding, Active power filter (APF), power factor (PF), total harmonic distortion (THD), modified active and reactive method (p-q)