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Improving the Power Quality of the Arc WeldingSupply using an Active Power Filter

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Abstract : This paper presents a new circuit topology suitablefor arc welding inverter applications, this topology is based onshunt active power filter (APF), in order to improve the powerquality and reduced the total harmonic distortion (THD) byconsequently improve the power factor (PF), a modified activeand reactive power method (p-q),which is combined with aself-tuning filter, is used to identify the harmonics currentsreferences of the load current, Also a PI controller has beenused to maintain the level of DC-link voltage at a constantvalue and improves its dynamic response; the voltage sourceinverter of APF is controlled by hysteresis current controller.The Major favorable features of this topology like fastresponse to load and source voltage conditions will result inbetter welding performance. The performance of the entiresystem is evaluated on the basis of THD of the source current,input power factor, dynamic response, voltage regulation androbustness to prove its effectiveness in terms of excellent powerquality.

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