

**A NOVEL METHOD TO FEED THREE PHASE LOADS FROM SINGLE SUPPLY
USING SINGLE PHASE TO THREE PHASE UNIFIED POWER QUALITY
CONDITIONER**

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This paper deals with the deployment of a local three-phase four-wire (3P4W) electrical power distribution system (EPDS), using a single- to three-phase unified power quality conditioner (UPQC) topology, called UPQC-1Ph-to-3Ph. The topology is indicated for applications in rural or remote areas in which, for economic reasons, only EPDS with single wire earth return are accessible to the consumer. Since the use of three-phase loads is increasing in these areas, access to a three-phase distribution system becomes preponderant. By adopting a dual compensation strategy, the proposed UPQC-1Ph-to-3Ph is able of draining from the single-phase electrical grid a sinusoidal current and in phase with the voltage, resulting high power factor. Furthermore, the system is also able to suppress grid voltage harmonics, as well as to compensate for other disturbances, such as voltage sags. Thus, a 3P4W system with regulated, balanced and sinusoidal voltages with low harmonic contents is provided for single- and three-phase loads. An analysis of the power flow through the series and parallel converters is performed in order to aid the designing of the power converters. Experimental results are presented for validating the proposal, as well as evaluating the static and dynamic performances of the proposed topology.