

# **Static Var Compensator and Active Power Filter with Power Injection Capability, Using 27-level Inverters and Photovoltaic Cells**

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## **Abstract**

An active power filter and static var compensator with active power generation capability has been implemented using a 27-level inverter. Each phase of this inverter is composed of three "H" bridges, all of them connected to the same dc link and their outputs connected through output transformers scaled in the power of three. The filter can compensate load currents with a high harmonic content and a low power factor, resulting in sinusoidal currents from the source. To take advantage of this compensator, the dc link, instead of a capacitor, uses a battery pack, which is charged from a photovoltaic array connected to the batteries through a maximum power point tracker. This combined topology make it possible to produce active power and even to feed the loads during prolonged voltage outages. Simulation results for this application are shown, and some experiments with a 3-kVA device are displayed.

## **Keywords**

Static VAr compensators, Active filters, Inverters, Photovoltaic cells, Photovoltaic systems, Power harmonic filters, Batteries, Bridge circuits, Transformers, Power system harmonics, Active filters, Multilevel systems, Solar power generation, Static var compensators (SVCs).