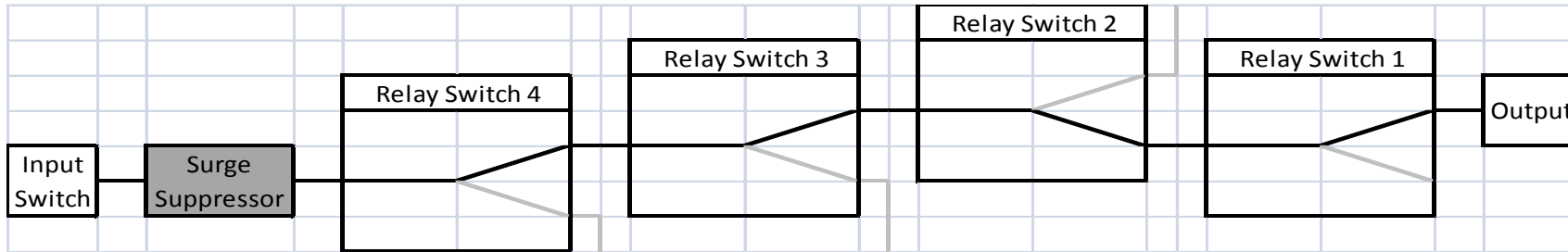


Case Study - Single Phase UPS Topology Differences

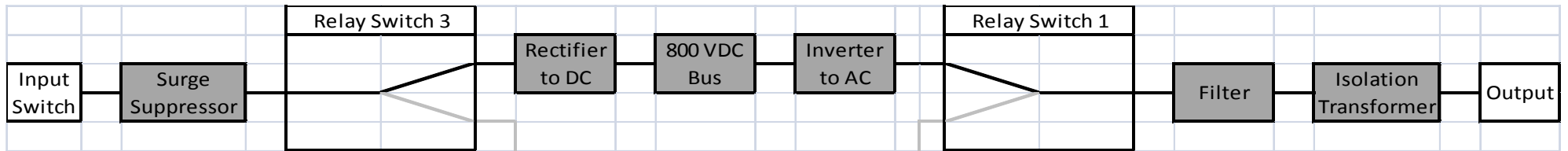
We recently had the opportunity to repair two APC SmartUPS 3000 UPS systems. Many have asked us over the years about the technology in this unit compared to online type UPS. The schematics reviewed in this repair process afforded us the opportunity to properly determine the differences. For comparison we used the schematic of a Powervar Security Plus UPS of similar size. Below is a simplified view of the normal operating mode and associated components. To aid in understanding, components affecting power quality are shaded in gray.

Normal Operating Mode - APC SmartUPS 3000



Text Description – Utility power comes in, passes through a surge suppressor and is carried through 4 switches to the output

Normal Operating Mode - Powervar Security Plus



Text Description - Utility power comes in, passes through a surge suppressor, is rectified to 800 VDC, re-inverted to new AC, filtered, passed through an isolation transformer to the output

The SmartUPS in normal mode protects the output similar to a power strip surge suppressor. The online UPS, as represented by the Powervar design, provides surge suppression plus conversion of the utility power to high voltage DC then creates a new AC waveform which is filtered and passed through a low impedance isolation transformer. In terms of National Electrical Code the SmartUPS operates as a surge filter on utility power and the Security Plus acts as a surge protected new separately derived power source.

Naturally all components in each system are not shown, including battery and all components not in the normal power path. The comparison is to show the differences in normal operation between these UPS which reside in the lower and the upper end of the performance and price scale in UPS. The hardware and data value of the load protected should be the determining factor regarding which technology best suits a particular application.