

Effective overvoltage control for capacitor bank switching applications



Pre-insertion inductors mounted on 138-kV Vertical-Break Style Mark V Circuit-Switcher.

S&C Mark V Circuit-Switchers are available with a variety of optional pre-insertion inductors for use in single-bank and multiple-bank (back-to-back) capacitor switching applications. Pre-insertion inductors are more effective than controlled-closing schemes and pre-insertion resistors for:

- **Limiting inrush current and overvoltage at the capacitor bank bus**—and thus induced transient voltage disturbances in substation low-voltage control circuits that can cause spurious signals, insulation puncture, and component damage,
- **Limiting phase-to-phase switching-surge overvoltages produced at remote transformers** as a result of energizing a capacitor bank . . . a phenomenon which can lead to decreased transformer life, or even transformer failure, because of the high voltage-stress concentrations which are imposed across the transformer windings, and,
- **Limiting overvoltages on long open-ended lines.** Such overvoltages can cause nuisance operation of surge arresters.

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Pre-insertion Inductors

Pre-insertion inductors are especially suited for limiting transient overvoltages which, through *voltage magnification*, can result in nuisance tripping of adjustable-speed drives and other sensitive electronic devices. Voltage magnification can occur where power-factor correction capacitors and/or voltage control capacitors are applied on the utility distribution system or on a utility customer's low-voltage bus, and is caused by a near-resonant condition between the switched capacitor bus and the capacitances at lower voltages.

For complete application information on S&C Pre-insertion Inductors refer to S&C Data Bulletin 711-95 or the nearest S&C Sales Office.

Construction

Each pre-insertion inductor is comprised of two or more close-coupled layers of stainless-steel or aluminum conductor wound, along with a resin-impregnated filament-fiberglass roving, to form a hollow glass-reinforced tube. An integral counter-wound stainless-steel damping winding is also provided to limit the voltage across the Circuit-Switcher interrupter during opening in capacitor bank applications. A layer of roving separates the layers of conductor and other layers of roving are added for mechanical strength and stability. The outer roving is finished with a coat of a silicone-alkyd paint for all-weather durability.