

maintenance costs.

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### 3. Static var compensators

The considerable development of power electronics is encouraging the replacement of synchronous compensators with **static systems for the control of the reactive power** such as for example **TSC** (thyristor switched capacitors) and **TCR** (thyristor controlled reactors).

These are an electronic version of the reactive power compensation systems based on electromechanical components in which, however, the switching of the various capacitors is not carried out through the opening and closing of suitable contactors, but through the control carried out by **couples of antiparallel thyristors**.

TSC allow a **step-by-step control of the reactive power delivered by groups of capacitors**, whereas with TCR a continuous control of the reactive power drawn by the inductors is possible. By coupling a TSC with a TCR it is possible to obtain a continuous modulated regulation of the delivered/drawn reactive power.

From the point of view of applications, these devices are used above all in **high and very high voltage networks**.

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### 4. Banks of static capacitors

A capacitor is a **passive dipole** consisting of two conducting surfaces called plates, isolated from one another

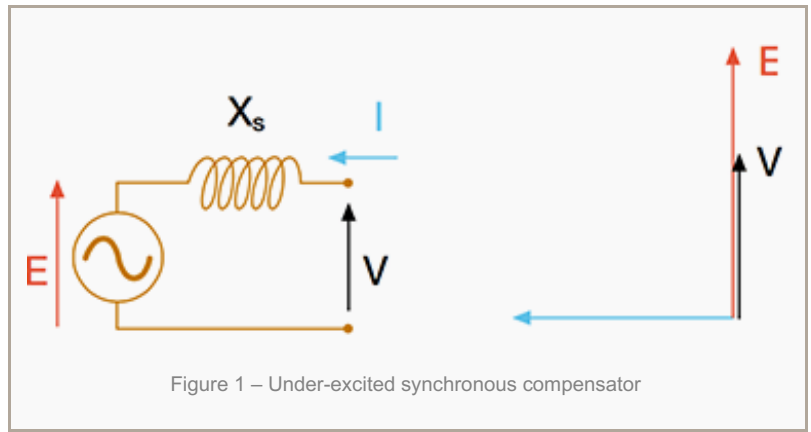


Figure 1 – Under-excited synchronous compensator

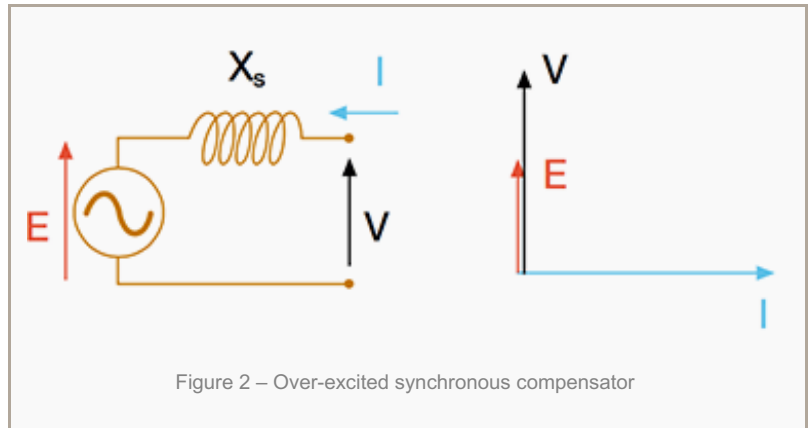


Figure 2 – Over-excited synchronous compensator

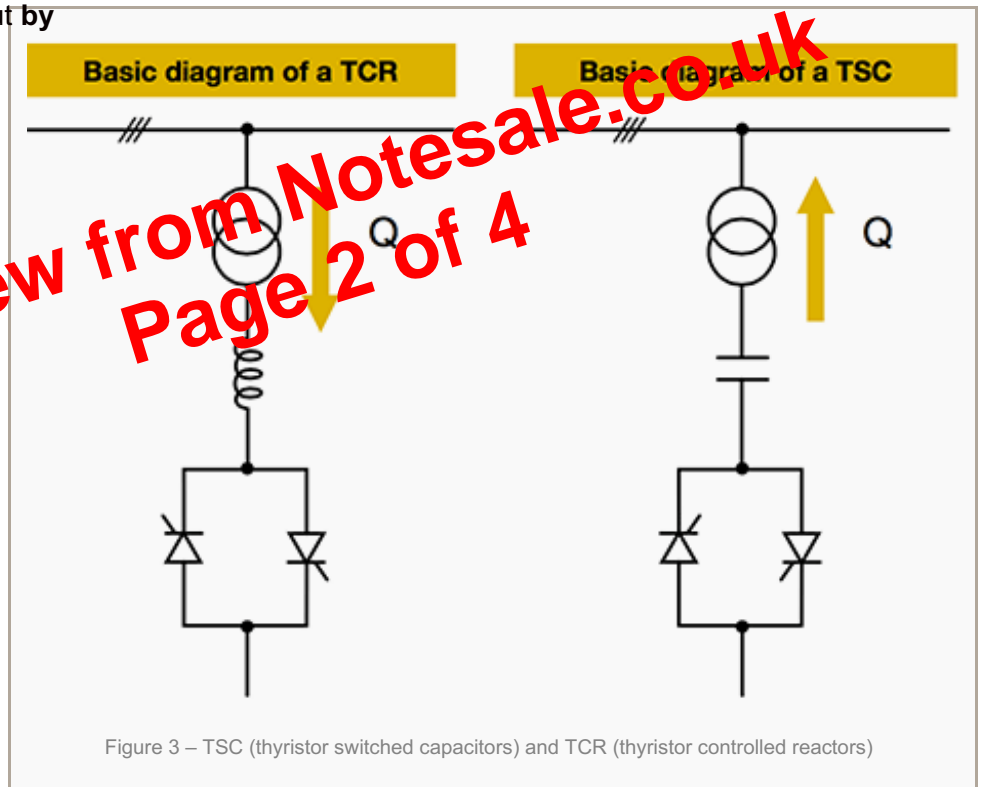


Figure 3 – TSC (thyristor switched capacitors) and TCR (thyristor controlled reactors)