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## Summary of Research on New Type Transformers with Reactive Power Compensation Capability

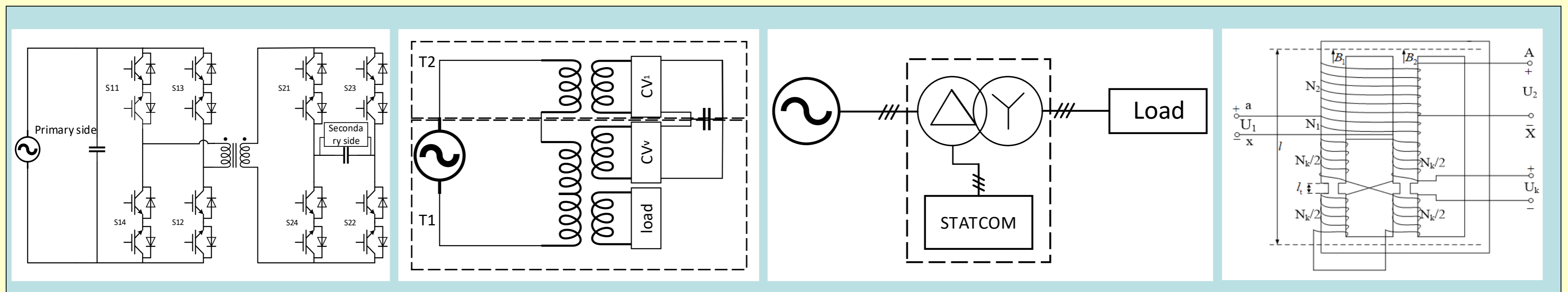
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In this paper, the classical topological structures of four new transformers are given, the mechanism of their compensation system reactive power is introduced, their advantages and disadvantages are analyzed, and their development trend is summarized and prospected.

### Schematic Diagram and Working Principle of New Type Transformer



**AC-AC power electronic transformer**

**single-phase hybrid transformer**

**dt-statcom system structure**

**magnetic saturation transformer**

**Power electronic transformer** is a new type of transformer that changes power frequency signal into high-frequency signal and then back to power frequency signal through power electronic technology. In the process of signal transformation, the amplitude and phase of voltage and current also change. This change is controllable, so we can output reactive power while realizing electric energy transmission.

**Hybrid transformer** is a new type of transformer which combines traditional transformer with power electronics technology. It distributes part of the capacity of traditional transformer to power electronics module to regulate reactive power. Thus, it has dual advantages of traditional transformer and power electronics technology.

**Distribution transformer integrated static reactive compensator (DT-STATCOM)** is a new type of transformer integrating traditional transformer and static var compensator. Therefore, on the basis of realizing voltage transformation function, it can also compensate the reactive power of the system.

The principle of **magnetic control transformer** is a new type of transformer designed according to the basic electromagnetism. According to the different working principles, the magnetic control transformer can be divided into three types: magnetic collection type, magnetic saturation type and magnetic material type.

### Summary

- Power electronic transformer is the development trend of transformers in the future, but there are still some problems in power electronic devices such as low reliability and complex control in the high voltage field.
- Three new multi-function transformers are expected to temporarily replace power electronic transformers, but each has its own problems to be studied and solved. The hybrid transformer uses many semiconductor devices, which has reliability problems; When the distribution transformer integrated static var compensator outputs reactive power, if the grid voltage drops temporarily, it needs short-term active power support; Magnetically controlled transformers are superior in saving floor space and cost, but the problems of harmonics and losses need to be studied and solved urgently.