

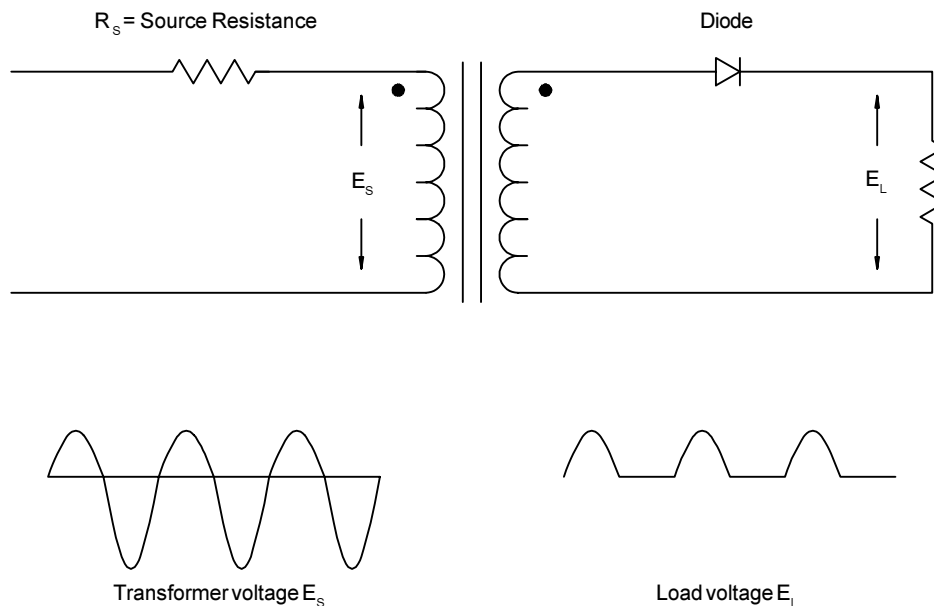
TRANS-GUARD

The use of zero-cross controllers on the secondary of a transformer can cause saturation of the transformer resulting in excess transformer temperatures and early failure.

Transformers can be made to saturate if a DC voltage is applied to the primary.

DC voltage can be induced on the primary by DC components in the secondary. The simple half wave rectifier circuit shown in the figure below, will induce a DC voltage on the primary due to the fact that the voltage drop across the source resistance during the cycle the diode conducts will lower the primary voltage when the diode conducts. The effect is the same as if a zero-cross controller were not providing an equal number of positive and negative half cycles to the load. Although not shown, the source inductance can also cause a DC voltage to occur on the transformer primary.

The Trans-Guard feature in certain models of Control Concepts controllers, eliminates the problem by always supplying an odd number of ON half-cycles and an even number of OFF half-cycles. This technique guarantees that no DC will occur independent of the source impedance or the load configuration.



Transformer saturation due to secondary DC current

The saturation problem is not likely to occur when the load is a small percentage of the transformer capacity, or when the source resistance and inductance are small. However, the potential problem is eliminated by the Trans-Guard feature in certain models of Control Concepts controllers.