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File # FTB-001	Title: What Are Transformers?	
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So what are transformers anyway? What do they do, and why do we need them? Let's start at the beginning.

Commercial, residential, and industrial buildings throughout the world are wired for a variety of voltage levels, but nearly all of them fall somewhere within the 100V to 480V range. Electrical power is transmitted rather efficiently at these voltages. However, most electrical devices require much lower voltages in order to operate, sometimes as low as 3V. One of the most common uses for transformers is to literally "transform" electrical power at high voltages into electrical power at lower voltages. These are "step-down" transformers.

Sometimes, the reverse may be desired; that is, it may be necessary to transform electrical power at a low voltage into electrical power at a higher voltage. These are "step-up" transformers.

There are even transformers that input and output the exact same voltage. So it may be asked, why bother? In a word -- safety. Generally, there is no hard wire connection between a transformer's input and output because the voltage transformation is done magnetically. Such transformers safely isolate the input from the output, and are therefore called "safety isolation" transformers.

In summary, transformers are used to accept certain voltages and transform them into higher or lower voltages, depending on the requirements of the specific electrical device(s) being powered. In addition, they provide a degree of safety by isolating the input and output voltages from each other. In fact, it is possible for a single transformer to step up, and step down, and provide safety isolation. Such custom designs are our specialty.

Watch for future articles further explaining the workings and uses of transformers.