

## 5.2 COMPARISON AUTO TRANSFORMER WITH TRANSFORMERS

<b>Characteristics</b>	<b>Conventional Transformer</b>	<b>Autotransformer</b>
<b>Construction</b>	A transformer consisting of three pairs of winding used to transform a set of three-phase voltages from one voltage level to another.	A transformer with a single electric winding, which can be used as a step-down or step-up device.
<b>Insulation</b>	Primary and secondary windings are insulated electrically.	Primary and secondary windings are not insulated electrically.
<b>Induction Principle</b>	Uses mutual induction	Self-induction as there is only ONE winding
<b>Windings</b>	There can be multiple windings like primary, secondary, and tertiary	There is ONLY one winding which serves as a primary as well as secondary.
<b>Size</b>	Large in size because of separate (multiple) windings	Small as there is only ONE winding
<b>Material for winding</b>	These type of transformers utilize more material in terms of winding	They require less material for winding
<b>Efficiency</b>	Less efficient in terms of operation and maintenance	Much more efficient
<b>Losses</b>	More windings so more losses	Losses are significantly less
<b>Output voltage</b>	Constant (unless taps are employed)	Variable (can be changed if needed easily)
<b>Applications</b>	Use to step-up and step-down the voltage in transmission and distribution systems	Widely used as Voltage regulator , Starter in an induction machine, Boosters in an AC feeders to increase the voltages

## **APPLICATIONS OF AUTOTRANSFORMER**

### **1. Testing an Electronic Device after Repairs**

After an electronic device is repaired, it is best to power up the device slowly to ensure that the replaced parts do not burn up. Often times, if high voltage is supplied without testing, the parts burn out. Using the autotransformer for slowly powering up the repaired device prevents the replaced part from getting damaged again.

### **2. To Power Up an old amplifier or radio**

If you haven't used an old amplifier or radio for a long time and wish to listen to it now, it is best to power it up slowly. The electrolytic capacitors need to be re-conditioned and that can be done by applying reduced voltage through an autotransformer.

### **3. Line Voltage Drop Compensation**

Long power lines often suffer from voltage drop, especially in applications that draw high current, like spas or hot tubs. An autoformer can be used to compensate for this loss of voltage.

### **4. Temperature Adjustment in Resistance-type Heater**

Temperature of resistance-type heater can be adjusted by varying the AC voltage with an autotransformer.

### **5. Changing Speed of a Fan**

By changing the AC voltage that is being applied to AC motors, their speed can be controlled. So, an autotransformer can be used to change AC voltage and control speed of motors which drive fans.

### **6. Cutting Styrofoam**

Styrofoam and many other kinds of foam are normally cut into shape by a hot wire cutting system. By using an autotransformer, you can control the hot wire's temperature and adjust it accordingly to meet the desired requirements