Simplicity in Power Conversion is Better

There's a lot of hype about switching power supplies and solid-state transformers. While there are times when using switching power supplies make sense, for most industrial customers the use of traditional linear power transformers or linear DC power supplies is still the best choice.

Linear power transformers are much simpler than solid state transformers, which reduces the chance of something going wrong. Linear transformers contain a low number of components, raw materials and simpler circuits that increase product reliability.

Both switching power supplies and solid-state power conversion utilize a multitude of high frequency components like power factor correcting chokes, low ESR capacitors, Schottky, fast recovery diodes, high voltage fast switching transistors as well as opto-isolators that can all fail. Therefore, the FMEA (failure modes and effects analysis) becomes more complex and impacts MTBF (mean time between failures).

Linear power supplies and transformers are simple devices, so their reliability is better, and the dc output voltage is free from the high-frequency noise as compared to switching/solid state power supplies and transformers.

When it is not necessary for the power supply to be portable (where a switching power supply would typically be needed), a linear transformer is still the best choice, especially inside a manufacturing facility where portability and the size of the transformer is not an issue.

Ideal applications for linear power transformers and power supplies include industrial controls. This would include controls for temperature, speed of motors, heating, air conditioning, refrigeration systems, showroom and residential lighting. In addition, it is better to use a 50 – 60HZ linear transformer in medical devices like I/V pumps, baby monitors, electrocardiogram machines and dental equipment. That's because a switching power supply emits high frequency radiation and electro-magnetic interference (EMI) which can cause problems to sensitive medical equipment.

While high frequency transformers can be slightly lower in price than a linear transformer due to lower copper usage and a smaller ferrite core, the winding technique needed to meet safety agency requirements could reduce the overall savings. The high frequency transformer is only one part of the switching power supply or solid-state electronics. When you factor in the rest of the high frequency components in a switching power supply and solid-state transformer, the linear transformer is typically less expensive.

The DC power supply and transformer are the lifeblood of any control system. When choosing a source of power conversion (AC to AC or AC to DC), simple is better.

About the PowerVolt Group:

PowerVolt Group includes PowerVolt, Inc., Ensign Corporation and Wabash Transformer. We have design and manufacturing facilities in the Midwest United States (Illinois and Iowa), China and Mexico. Our engineering team has more than 180 years of cumulative design experience. We manufacture linear DC power supplies and power transformers. Products include Class 1, Class 2, Control Transformers, and Power Transformers with traditional steel cores for 50Hz; 500Hz operation and ferrite and toroid cores for higher frequency applications. Feel free to reach out to us at 630-628-9999, email us at sales@powervolt.com or visit our websites (www.powervolt.com,www.ensigncorp.com, or www.wabashtransformer.com) for any additional questions or to discuss new or existing transformer or power supply designs.