APPLICATION NOTE

UNDERSTANDING THE FIVE TRANSFORMER TYPES

Born from the industrial age, transformers are one of electrical engineering's most useful inventions. They are used in all types of electrical equipment applications ranging from HVAC, water pumps, pool and spa, food service and electronics. Regardless the type of transformer, their general purpose is the same—transform electrical power from one type to another.

The Basics of How Transformers Work

A transformer is a passive electrical device designed to change one ac voltage to another by magnetic induction. They can either "step up" or "step down" voltage to match the utility's incoming supply voltage to the voltage required by the user's end product.

There are many types of transformers in various shapes and sizes, each falling into classifications based on aspects such as voltage levels, winding arrangements, or usage. Custom transformer configurations are common for applications that require a transformer with a single, specialized function such as constant voltage or constant current.

What are the 5 Transformer Types?

Isolation Transformer - Formally a transformer with a 1:1 turns ratio, isolation transformers are mainly used to prevent shock hazards. They have separate primary and secondary windings for the purpose of isolating the circuit from the supply source. The transformer is then able to provide protection against a power surge if an electronic circuit breaks down. Common applications include medical, telecommunication and remote control equipment.

Autotransformer - Autotransformers have only one winding, which is shared by the primary and secondary circuits. While they do not provide isolation, they offer substantial savings when used to obtain small increments of voltage above or below the input voltage. They are ideal for induction motor starters and low voltage applications.

Class II Transformer - A Class II transformer is used to supply Class II circuits, commonly used on HVAC/R control systems. The maximum Va (volt-ampere) generally offered is 75 (Hartland offers Class II Transformers as high as 100 Va), and the most common secondary voltage is 24 V ac. All Class II transformers are either inherently or non-inherently limited, meaning the maximum output current is limited either by the intrinsic coil impedance or by a fuse or circuit breaker. It's worth noting that we offer transformers up to 150 Va, and we also have the ability to customize transformers from 3 Va up to 200 Va.

General Purpose Transformer - As their name suggests, general purpose transformers are typically used for general lighting and other low voltage applications. These transformers include any Va rating along with primary and secondary voltage ratings up to 600 V ac. Typically no fusing is required, but internal fusing is an option.

Control Transformer - A type of isolation transformer, control transformers are designed to provide rated output voltage at full Va. As the load decreases, the output voltage will go up. Conversely, if the load increases it will result in lower output voltages. Providing excellent voltage regulation, control transformers are commonly used in industrial applications.

For more information on transformers visit HartlandControls.com

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