



APPLICATION NOTE

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Product Family: Control Transformers

Number: AN-MISCH-007

Subject: Common Questions about Control Transformers

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Revision: A

What is a Control Transformer?

Designed with PLC's in mind:

With the advances of high-speed electronic trip devices in circuit breakers, low impedance devices, fuses, and safety conscience engineers and panel designers creating control systems have become increasingly aware of the phenomena of transformer inrush current.



Inrush current although unavoidable can be limited with the deployment of High quality Control Transformers like the Hammond Power Solutions PH Series available from AutomationDirect..

The PH Series of control transformers are specifically designed for high inrush applications requiring reliable output voltage stability. The PH Series of control transformer gives unparalleled performance stability to our Directlogic line of PLC's and PS series of power supplies. In addition, they are designed to meet the basic needs of industrial applications where electromagnetic devices such as relays, solenoids, starters, etc. are used.

Robustness of Design:

The PH Series of control transformers use high-quality insulating materials to electrically insulate turn-to-turn windings, layer-to-layer windings, primary to secondary windings and ground. The integration of these materials prevents phenomena such as high and low frequency transients and capacitive coupling effect between the primary and secondary windings. It gives the desirable low temperature rise providing a wide margin of safety and reliability for years to come.

All PH Series transformers have encapsulated coils encased in a custom injection molded cover that protects the coils and terminations from moisture, dirt and other industrial airborne contaminants. The robustness can be seen through the UL/CE approvals.



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Needed information for proper selection:

Selecting a control transformer requires that you have a first hand knowledge of the specific application for the transformer, and that you understand some basic terms used in the selection process. By using the following information, you will be sure to select the correct control transformer for you application.

To select the proper transformer, you must first determine three characteristics of the load circuit. They are total steady-state (sealed) VA, total inrush VA, and inrush load power factor. **Total steady-state "sealed" VA** is the total amount of VA that the transformer must supply to the load circuit for an extended length of time. Calculate by adding the total steady-state VA of all devices in your control circuit. (*The operating VA data for the devices should be available from the manufacturers.*)

The **inrush VA** is the amount of VA that the transformer must supply for all components in the control circuit that are energized together. Consideration for the start-up sequence may be required. (*Inrush VA data should be obtained from the device manufacturers.*)

The **inrush load power factor** is difficult to determine without detailed vector analysis of all the control components. In the absence of such information, we recommend that a 40% power factor be utilized.

With this information in hand, one can use the **6 sizing steps** outlined in the Volume 12 catalog from ADC.

Common Control Transformer questions:

Q. When you calculate the VA requirements of a transformer, do you use the primary or secondary voltage?

A. When selecting the VA requirement, you use the secondary voltage.

Q. Can you use the Control Transformer in reverse?

A. Yes, a control transformer can be used in reverse. However, keep in mind the output voltage will be less than it's rating, due to the compensation factor of the windings.

Q. Can a control transformer regulate the output voltage?

A. A control transformer will not regulate voltage. Output voltage is a function of the coil's turn ration only, times the input voltage.



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Q. Explain the “VA” or “Volt Ampere Output” rating?

A. The VA or volt ampere output rating designates the output which a transformer can deliver for a specified time at its rated secondary voltage and rated frequency, without exceeding its specified temperature rise.

Q. What is the effect of “Overload”?

A. When a transformer is continually overloaded, excessive heat develops and the insulation system will begin to breakdown. As a result, the life expectancy of the transformer is shortened due to the heat exceeding the rating of the insulation system.

Technical

Assistance: If you have questions regarding this Application Note, please contact us at 770-844-4200 for further assistance.