

TechTopics Topic: Accuracy of CTs used in Medium Voltage Control Equipment

In specifications for medium voltage control equipment, we often see requirements for high relay accuracy ratings for the current transformers. While high relay accuracy ratings are frequently necessary for circuit breaker applications, high accuracy for CTs in medium voltage control equipment is seldom needed for the application.

In circuit breaker applications, there is a need for accuracy at relatively high levels of short-circuit current, and if the protective relays are located remotely from the circuit breaker (and its current transformers), the secondary circuit will have appreciable burden. This is a common consideration for outdoor circuit breakers, or for circuit breakers in metal-clad switchgear used with remote transformer differential relays.

The situation in medium voltage control equipment is quite different. In NEMA Class E2 control, current interruption is performed by the contactor for load currents, during starting, and for moderate overload currents. However, interruption of short-circuit currents is accomplished by current-limiting fuses. Class R fuses are used for motor starting applications, and Class E fuses are used for protection of transformers and non-motor loads. The coordination of the fuse time-current characteristic and the contactor (and its overload relay) is designed so that the current-limiting fuse will interrupt first for all currents above approximately 8-12 times the primary current rating of the current transformer.

Since the current-limiting fuse performs the interruption for short-circuit currents, the current transformers do not need to have great accuracy for such currents. As a practical matter, the current transformer does not have to provide for accurate sensing of currents above the motor locked rotor current.

For most applications, the current transformers provided with Series 81000 medium voltage control equipment have a relaying accuracy of C10. The overload relays used with today's controllers are low burden devices, and the circuit distance in the current transformer circuit is small, so that the burden of the wiring is small. Therefore, the standard C10 accuracy is satisfactory.

While we can provide higher accuracies (e.g., C20 or C50) for many CT ratios, the extra cost of the higher accuracy seldom conveys an economic benefit.

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