

30 Cycle Ratings Short Circuit Studies & Coordination Studies

A Short Circuit Study and a Coordination Study are two highly important steps that should be taken to protect personnel and the electrical distribution system.

The Short Circuit Study will determine the magnitude of current available at various points of the electrical distribution system, if a fault occurs. It is imperative that the protective devices on the line side of the selected point in the Short Circuit Study be capable of sensing and interrupting the fault current available. Likewise, any non-protective devices in that segment of the distribution system that would be exposed to a fault of the magnitude calculated in the Short Circuit Study, must be able to withstand that fault current for the calculated time duration.

The Coordination Study is made to determine the proper settings of the protective devices in the distribution system so that the area of an outage, due to a fault, is limited to the affected portion of the distribution system. This will leave the remainder of the system undisturbed, preserving the continuity of service in the unaffected areas. Isolation of a faulted circuit from the remainder of the installation is mandatory in today's modern electrical systems to prevent widespread power blackouts.

This isolation is achieved by selective coordination as calculated in the Coordination Study. For circuit breaker coordination, the engineer must consider the fact that when a high fault current occurs on a circuit having several breakers in series, the instantaneous trip on all breakers may operate without coordination. This would result in a widespread isolation of the faulted portion of the circuit instead of a controlled, selective portion where the fault originated. In these cases, the instantaneous protection can be suppressed, and the short time delay setting used to improve system coordination. While the use of circuit breaker short-time delay settings may negate some degree of protection and increase any arc flash hazard, the avoidance of a widespread power blackout is mitigated.

How does this affect the selection of the transfer switch in the installation? Quite simply, any transfer switch being placed in an electrical distribution system must not only have the ability to withstand the fault current calculated by the Short Circuit Study, but it also must be able to sustain that fault for the time duration required by the Coordination Study; this time frame is typically less than a few milliseconds.

Since most transfer switches on the market are series rated for only 3 cycles when coordinated with upstream protective devices, care should be taken when applying these transfer switches where the specific requirements of the Short Circuit and Coordination Studies indicate the potential of a fault in excess of that minimal three cycle duration.

Lake Shore Electric Corporation has been manufacturing our Insulated Case Transfer Switches since 1922. These transfer switches have our published interrupting ratings that are not series rated. They can operate as a standalone device, not dependent on upstream protection. However, they may also be adjusted to allow downstream breakers to clear for up to 30 cycles. In addition, they all carry a 60-cycle rating.



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