

Vinny's Bottom Line – A Look At Value-Engineering Ground Fault Protection

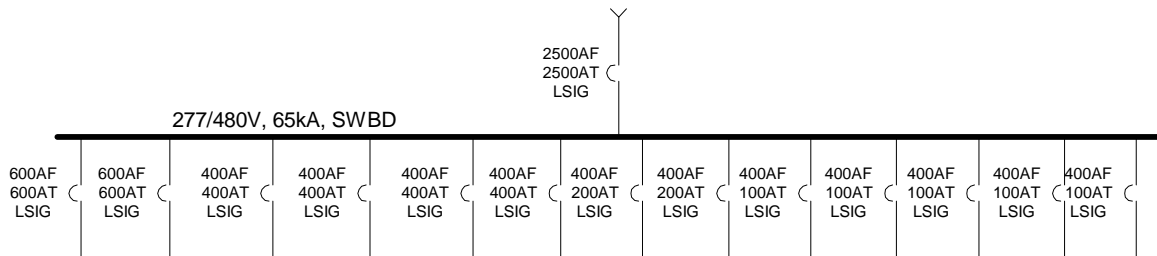
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As a sales engineer covering the commercial construction market my customer base is mainly made up of electrical contractors who are always looking for the best price, the bottom line. Many times even the bottom line price is not good enough and the contractor is looking for more. Here's a look at how to reduce the price of a typical ground fault project while keeping it sound and possibly even improving on it from a technical engineering perspective.

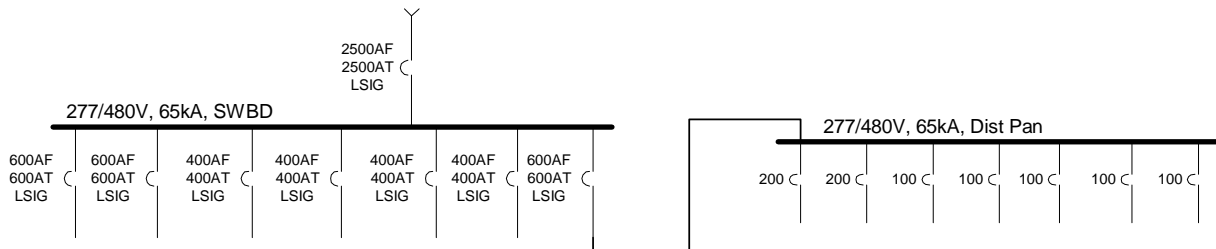
Systems Configured and Priced

Where ground fault protection is required in certain healthcare applications, NEC 517.17(B) extends that requirement to two levels of ground fault protection. This is done for selectivity and thereby continuity of service for the system. In fact, the scope of these applications has been expanded in the 2005 code. For these applications, and others where up time is vital, we'll investigate some considerations in their design. Two case conditions were priced and analyzed as follows:

1. A 480V switchboard rated 2500A, 65kAIC, 3-ph 4-w, with a 2500A main and thirteen feeders sized as follows: 2-600A, 4-400A, 2-200A, 5-100A. Trip units include LSIG functions.



2. Same as item 1 but there are only seven feeders with (LSIG) in the main switchboard, as follows: 3-600A, 4-400A. The seven breakers smaller than 400A are placed in a separate 600A panelboard, which is fed from the extra 600A feeder added to the main switchboard. These smaller breakers only include standard trip units without ground fault protection.



Analysis

1. This represents our base case.
2. Even though an extra 600A breaker was added to the main switchboard in this case, as well as a separate 600A power panelboard, the net result is an equipment cost savings of about 20%. This is due to the relatively high cost adder for the ground fault function in the smaller breaker ratings. In general there is a cost advantage to limit the main switchboard breaker sizes to 400A or larger when they are to include GF protection. Depending on other details of the overall project, this change could also be beneficial in many other ways including selectivity and future expansion capability.

Other considerations are also important to take into account prior to implementing such a change, like the space needed for an additional panelboard, and the cost to have it field installed. If these items can be accommodated then why not collect the savings?

Conclusion

Proper evaluation of project requirements may lead to true value improvements that can enhance the overall design while reducing costs. They must always take into consideration code requirements, good engineering practice and the unique needs of the system.

Notes:

Key to abbreviations used: A = amperes; AIC = amps interrupting current; k = x1000; LSIG = long-time, short-time, Instantaneous and ground-fault trip function; ph = phase; w = wire.