

TECHNICAL ANNEX

PROTECTIVE DEVICE COORDINATION

The Protective device coordination can be viewed as a planned reliability measure using trip characteristics of protective devices to select and minimize effected equipment in the event of abnormal system conditions.

To break this down let's use an example: An operating paper mill has multiple devices being supplied power from the same distribution switchgear. The main breaker is rated at 3200 amps continuous, and the distribution breakers vary from 800-1600 amps. A system such as this can be seen in Figure 10.1 shown below.

If one of our 1600 amp breakers have an instantaneous setting of 10x, this means that if the equipment is operating correctly, it will not interrupt a fault until it

reaches 16,000 amps (+/- 10%). This system may be designed this way for various reasons such as to allow for a large motor to start up or to avoid nuisance trips during current spike. (More likely the instantaneous level has been turned up over time by maintenance staff not following the correct trouble shooting procedures.) If the main breaker with a similar trip unit and clearing time has the instantaneous set to 4x, this means the breaker will interrupt a fault at roughly 12,800 amps, which is less than our 1600 amp distribution breaker. This can be problematic as the main breaker will clear a fault with a lesser magnitude then the distribution breaker causing for an unnecessary outage on all additional equipment being supplied power only from the 3200 amp main.

Figure 10.1 Sample Distribution System

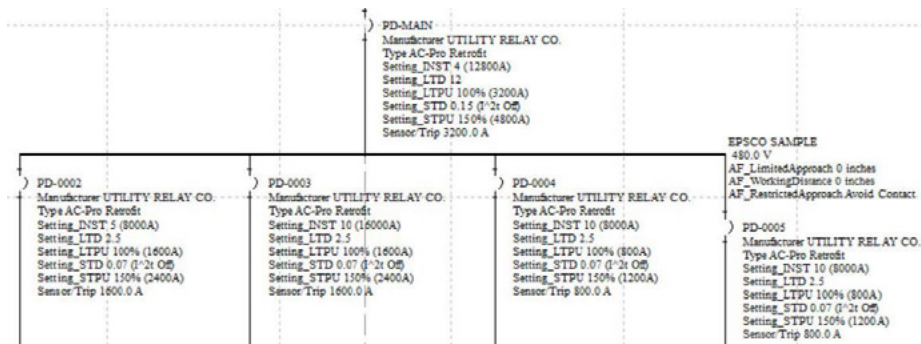


Figure 10.2 System Coordination

