

Lessons Learned Commissioning Protective Relay Systems

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Abstract

Commissioning protective relays has changed with the increased use of microprocessor-based relays. Many relays have multiple functions, and logic that used to be contained on wiring diagrams or control schematics now reside in relay settings.

However, the newer relays also provide many advantages in commissioning:

- Event reports that show a precise capture of voltage and current waveforms, inputs and outputs and relay elements.
- SERs that show time-stamped assertion and de-assertion of relay elements.
- Metering and synchrophasor data that can be used for instantaneous monitoring of input signals.

Using their own personal experiences and those learned from working with field personnel, the authors provide a variety of testing examples on transmission, distribution, and plant systems. They show what the “expected” performance is, what to look for, problems to avoid, and lessons learned from system data taken from relays during commissioning.

Discussion Points

1. Testing microprocessor-based relays is a challenge because it is typical to see multiple functions and elements in one hardware platform. Many functions that used to be documented in a control schematic or wiring elementary now reside in the logic within the relay.
2. This paper discussed lessons learned during field commissioning many different systems. These include:
 - a. Distribution feeder protection and reclosing
 - b. Transformer differential protection
 - c. Transmission lines
 - d. Motor starting and protection schemes
 - e. Breaker control schemes including main-tie-main
3. Learning from incorrect operations or procedures helps avoid future mistakes and problems and teaches the attendees what to expect.