

KINECTRICS INTEROPERABILITY TESTING LAB



MAKING THE MOST OF NEW OPPORTUNITIES TO ENHANCE RELIABILITY



Challenges and Opportunities

The rapid evolution of communication, information and computer technologies presents both opportunities and challenges to the power industry. The need to satisfy increased customer reliability expectations while operating in a difficult, cost-conscious competitive environment has encouraged many utilities to refurbish, or build substations with integrated protection, control, monitoring and metering systems. With this drive, a new set of global standards IEC 61850, IEC 61970, IEC 61968 has emerged. The new standards facilitate seamless communications over a common, open information highway, with data being accessed at local and remote sites from Intelligent Electronic Devices (IEDs) for protection, control, metering and monitoring.

Kinectrics can assist utilities in this enterprise by offering state-of-the-art testing services that cover IEC 61850, IEC 61970 and IEC 61968 based interoperability tests, function and performance tests, impact studies and site commissioning services. By working with an established independent company like Kinectrics, vendors and utilities can discover potential product issues in advance, thereby enabling them to avoid costly issues and problems during the integration, operation and maintenance phases.

Advanced Testing Facility

Kinectrics' Interoperability Testing Lab offers full-scope testing for Substation Automation Systems, EMS, and DMS systems to ensure seamless communications in power utilities. Our facilities are equipped with a state-of-the-art Omicron CMC256 test set with full Net-1 option, as well as a Real Time Digital Simulator (RTDS) with full GTNET option and a software suite for GOOSE and message generation, Common Information Model (CIM) testing, background traffic simulation and protocol analysis.

Standard Open-loop Testing

Perform open loop tests by current and voltage injection on the Device Under Test (DUT) and by digitally generated GOOSE / GSSE messages from the Omicron CMC test set, with parallel copper and Ethernet wiring to verify if the DUT is compliant to the standard.

Powerful Closed-loop Testing

Perform transient simulation on a simulated power grid via models built using the advanced RTDS. The outputs of current and voltage signals from the sensing points are either amplified to the level suitable for secondary injection tests, or digitized current and voltage signals are directly communicated to the DUT.

In addition, the digitally generated GOOSE / GSSE signals are directly communicated to the DUT and the response from the DUT is fed back to the RTDS to influence the simulation. This type of closed loop testing not only evaluates the devices under test, but also their impact on the power grid and whether their application best suits the needs of the power utilities.

Full Scope Testing

With unrivalled expertise based on several decades of R&D and field experience in protection and control systems, Kinectrics is uniquely qualified to offer full scope, one-stop-shopping to meet your needs in moving to IEC 61850 based substation automation systems. Kinectrics can help you ensure a smooth transition and seamless communications between IEC 61850, IEC 61970, IEC 61968 and the control centers.

1. Interoperability Testing

Perform single device testing, multiple device interoperability testing and system integration testing:

- Single device IEC 61850 testing covering both station bus and process bus
- IEC 61970 / IEC 61968 CIM testing
- Interoperability testing
- System integration and testing

IEC 61850 Training Courses now available. Visit our Web site at www.kinectrics.com for details.

2. Functionality Testing

Evaluate the functions of the DUT as specified and its response under the following conditions:

- Single device protection setting, timing, zone reach testing
- Multiple devices protection scheme testing involving communication
- Single / multiple devices local / remote control schema, interlocking testing

3. Performance Evaluation

Co-ordination with utilities to define performance evaluation criteria, conduct performance evaluation in terms of latency delay, priority handling and fall-over handling etc. for communication systems, as well performance evaluation on:

- Substation communication architectures
- Substation automation systems
- Energy management systems
- Distribution management systems
- Protection and control schemes

4. Impact Studies

Using detailed transient-based power system component models in the RTDS for impact studies, current and voltage signals from the RTDS are amplified and injected into the DUT along with the digitally generated current / voltage / binary signals. The response from the DUT is fed back into the RTDS, where the simulation continues in real time to evaluate the impact of the DUT on the entire power system. The scope of these impact studies includes:

- Single device and its impact on the power system
- Coordinated multiple devices and their impact on the power system
- Interoperation schemes and their impact on the grid

5. Site Commissioning

Provide one-stop site commissioning covering all aspects of:

- Integration test to ensure the entire Substation Automation System functions interactively
- Interoperability test to ensure the inter-relay protection / control schemes works as designed
- Functionality test to ensure the device / system functions effectively. This includes checking all set-points, verifying zone-reach and time delays associated with the scheme.

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