

SEL Smart Grid Solutions

Improve Grid Reliability With Wireless Fault Indication

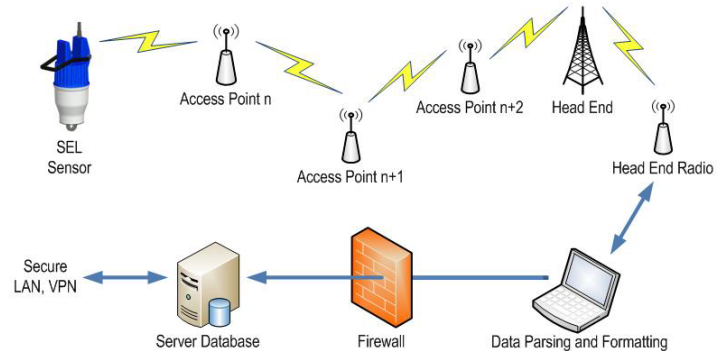
Reduce Overhead Fault-Finding Time Using Wireless Communication

SEL's ongoing wireless fault indicator program with Commonwealth Edison (ComEd) reduces fault-finding time by communicating fault status back to a central location. As part of an initiative to make the ComEd grid smarter, the utility distributed the SEL fault indicators throughout their Landis+Gyr mesh network in northern Illinois. The result is that utility crews locate faults more quickly, thereby improving distribution reliability. SEL is working to use the ComEd solution as a platform for fault indicators that will operate within any utility's existing infrastructure.



The SEL wireless fault indicator is smart grid technology:

- Remote sensing reduces fault-locating times to within minutes.
- Sensor data combined with protective relays and recloser controls data enable distributed intelligence.
- Indicators leverage existing or new communications infrastructure to improve reliability metrics, especially CAIDI.



How It Works

The fault indicator stores load and temperature data and monitors the distribution line for loss of voltage, loss of current, or fault events. Periodic reports or exception events are then transmitted to a nearby access point on the mesh network. The network repeats the data packet until it reaches the head end at which point the dispatch center sends a crew to the faulted section.

Features and Benefits

- Monitor average load current, ambient temperature, fault threshold, history of outages and surge events, and battery status.
- Schedule maintenance more efficiently by using stored data profiles.
- Prevent false tripping. The inrush restraint feature allows for coordinated integration with automated reclosing schemes.
- Install quickly using a standard hot stick.
- Follow visual target displays in addition to remote indication.

Smart Solution Pricing

The budgetary price is under \$500 per unit. Operation of the device is dependent on a mesh network communications system, which is not included in the price.

Smart Solution: SEL Wireless Fault Indicator Sensor Guideform Specification

The wireless fault indication sensor shall provide the ability to collect load current and temperature and fault event data from overhead distribution lines, and transmit the data via a radio frequency communications link. Its purpose is to reduce fault-locating times and improve system reliability. Specific requirements are as follows:

Sensor Architecture. The sensor shall consist of a faulted-circuit indicator and data collection device integrated with a transceiver that can transmit unsolicited data periodically or in response to a fault event.

Scalability. The sensor shall be capable of monitoring a single-phase of an overhead distribution line.

Addressability. The sensor shall be addressable to allow collocation of multiple units on the same radio network infrastructure.

Human-Machine Interface (HMI). The sensor shall utilize a backup visual indicator to indicate normal or fault condition.

Level of Protection. The sensor shall be suitable for operation on overhead distribution lines.

Antenna Options. The sensor shall have an integrated antenna.

Two-Way Communications. The sensor shall operate via a two-way communications scheme and conserve energy while also allowing a user to collect phase sensor status on pre-defined intervals or in response to fault events.

Operational Frequency. The sensor shall communicate in the 900 MHz ISM band.

Fault Indicator Phase Sensor Compatibility. The sensor shall be compatible with customer-defined communications network infrastructures.

System Powering. The sensor shall be powered by a 20-year, shelf life lithium cell. Battery health information shall be included in the data packet.

Environment. The sensor shall be suitable for continuous operation over a temperature range of -40° to $+85^{\circ}\text{C}$.

Warranty. The sensor shall have a minimum five-year warranty.