



Transmission Line Security Monitor

Self-powered intrusion detection monitor for critical transmission tower installations

The Lindsey TLM Security monitor provides both early warning of intrusion around the base of transmission towers and attempts to compromise tower integrity. Candidate structures would include dead-end towers located at critical locations such as river, valley, or highway crossings. Infrared sensors detect human presence at the tower base while sensors monitor vibration patterns associated with tower tampering. The TLM Security Monitor communicates seamlessly with other TLM Security or Conductor Monitors. The TLM Security Monitor is an affordable, easily installed, self-powered transmission tower intrusion monitoring solution for system voltages up to 765kV.



Human Intrusion Detection

When installed on the hot side of a dead-end insulator string, the Lindsey TLM Security monitor's onboard infrared (IR) sensor can detect and report the presence of a human heat signature in the area at the base of the tower. When mounted 20m (65 feet) above ground, the IR sensor monitors a 10m (33 feet) diameter area below.

Tower Tampering Detection

Three-axis MEMS accelerometer and built-in Fast Fourier Transform (FFT) processing monitors the vibration frequency pattern of the conductor. Built in algorithms developed by the U.S. Department of Energy's Idaho National Laboratory analyze these patterns to detect and report tower vibrations associated with tower tampering, such as cutting or unbolting tower steel.

Self-Powered, Simple Installation

Self-powered by line current as low as 100A. Fast live line installation using hot stick or bare hand practices through system voltages up to 765kV L-L.

Self-Healing Mesh Radio Communications

Built in self-healing mesh wireless radio utilizing AES-256 bit encryption passes data from one-sensor to the next. Lindsey TLM Endpoint communication gateways provides secure transmission of the gathered data to the cloud, directly behind utility firewalls, or to SCADA via native DNP 3.0 protocol.

Lindsey TLM Conductor Monitors

The TLM Security monitor is based on the same platform as the Lindsey TLM Conductor monitor, which continuously measures conductor clearance to ground or under-build.

TLM Security and Conductor monitors may be used on the same transmission line and will collect and pass data onward from one another.

TLM Conductor Monitor Repeater

Operating with the same communications path as TLM Conductor monitors, a TLM Security monitor effectively functions as a repeater for TLM Conductor monitors extending their communication range.

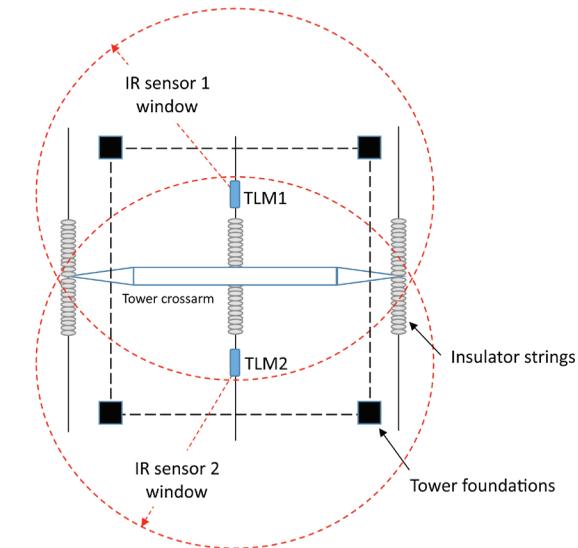
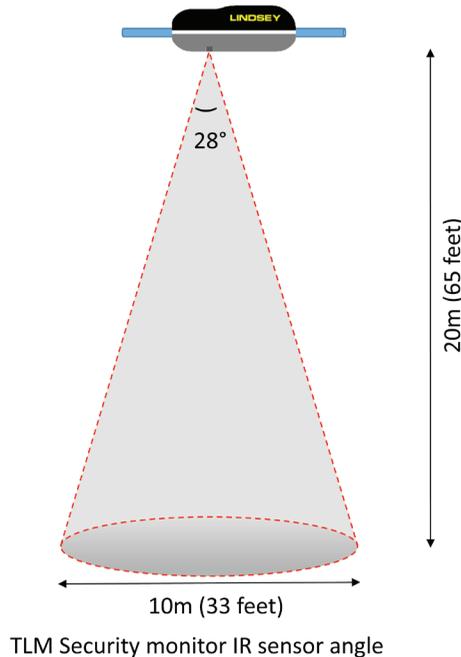
Parameter	Specification
Communication frequency band	915MHz +/- 13MHz
Direct communication range	1.0 mile (1.6 km) max
Conductor current	100A to 1500A
Conductor voltage	750kV max
AC voltage frequency	50Hz - 60Hz
Conductor temperature	250°C max
Conductor size	Up to 1.8" (46mm)
Vibration sensor frequency	1KHz max
Tilt-pitch	-90° to +90°
Angle-roll	-90° to +90°
Infrared (IR) sensor lens angle	27.7°
Operating ambient temperature	-40°F to 122°F (-40°C to 50°C)
Dimensions	16.5" (L) x 6.75" x 8.75" (W) (420mm x 170mm x 220mm)
Weight	17 lbs (7.7kg)

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Typical Application

The figure below shows how two TLM security monitors can be mounted on a dead-end transmission tower to provide full intrusion detection around the base of the tower. One TLM security monitor is mounted on the center-phase conductor at the end of each tension insulator string. The field of views of the two downward looking monitors overlap in the center, and provide an IR view of all tower footings. Both monitors look for vibration patterns associated with tower tampering. Agreement between the two monitors minimizes false alarms.



Overhead view of dual TLM Security sensor deployment on dead-end transmission tower

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