

SENSTAR®

FiberPatrol® FP1150 for Data Conduit Protection



Fiber optic third-party interference (TPI) detection for critical communication networks

FiberPatrol FP1150 is an advanced fiber optic sensor for securing data links and cable infrastructure. Using Distributed Acoustic Sensing (DAS), the FP1150 detects, locates, and classifies potential threats in real-time, enabling operators to proactively safeguard critical infrastructure and maintain uninterrupted connectivity.

The disruption of communication links and buried cable infrastructure can devastate operations across mission-critical facilities with far-reaching consequences. Even minutes of downtime can cost hundreds of thousands of dollars, damage an organization's reputation, trigger business penalties, and threaten core operations. Repairs often require specialized teams and equipment that can extend downtime for days.

Disruptions can cascade through dependent sites and organizations, creating public safety risks, economic losses, and operational paralysis in our increasingly interconnected digital environment.

By repurposing dark fibers within communication links as distributed sensors, FiberPatrol FP1150 detects and locates potential TPI events anywhere along the cable's pathway, before damage can occur, helping to prevent costly service interruptions, infrastructure damage, and data theft.

Features and Benefits

- Detect and locate data conduit third-party interference (TPI) events such as nearby digging, presence of heavy vehicles, and direct manipulation for the purposes of tapping or sabotage
- Covers a distance of up to 100 km (62.1 mi) of fiber per sensor unit
- Requires only one fiber within a cable or cable bundle for sensing purposes
- Pinpoint TPI events with a ± 4 m (13 ft) accuracy
- Accurate locating of multiple simultaneous intrusions
- Sensing function continues to operate up to the point of a cut
- Dual sensor channels
- High Probability of Detection (PD) and low Nuisance Alarm Rate (NAR)
- Software-configurable detection zones
- No outdoor power or supporting infrastructure required
- No electronics or grounding points required in the field
- TPI events reported by zone number, cable distance, and/or GPS coordinates
- Multiple options for integration with SMS, VMS and PSIM platforms
- Easy to install and maintain
- Does not connect to active fibers, no possibility of unauthorized data access or injection
- Per-meter licensing
- Sensor unit is PEN tested and includes cyber-hardening procedures

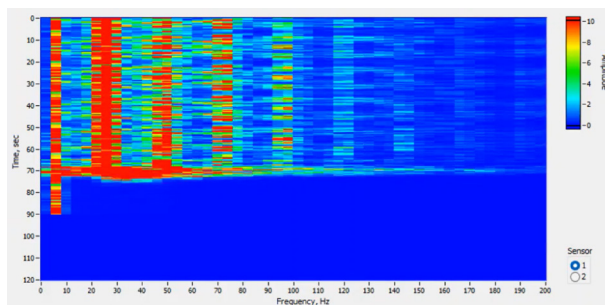
HOW IT WORKS

FiberPatrol employs advanced Optical Time Domain Reflectometry (OTDR) by transmitting precisely timed laser pulses into a single-mode optical fiber and measuring the Rayleigh backscatter signals. A disturbance of the fiber caused by acoustic vibrations alters the backscattered light, producing measurable patterns.

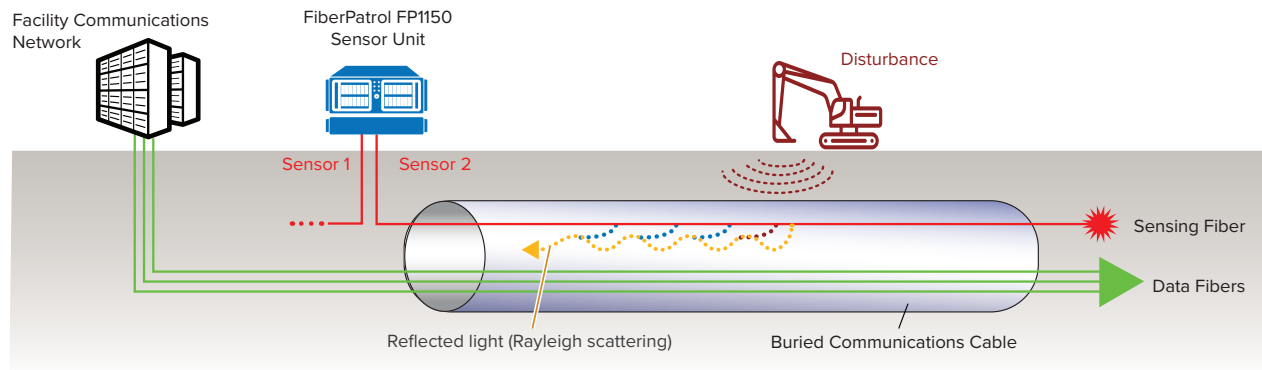
FiberPatrol's reflectometry-based technology, unlike traditional transmission-based systems, does not require light to traverse the full cable length. This ensures that if a cable is severed, the system maintains full detection and location capabilities up to the precise point of the cut, enabling redundant, cut-immune configurations that provide 100% sensing coverage even after a cable cut.

DETECT, LOCATE, CLASSIFY

Potential TPI events such as manual digging, machine digging, or the presence of heavy vehicles create characteristic vibrations. The system distinguishes these from background vibrations and declares an alarm when the detection criteria are met. Events are accurately located even when multiple events occur simultaneously.



FiberPatrol analyses the spectral content of the received signal. This chart shows the characterization frequency response of a parked vehicle near the cable.



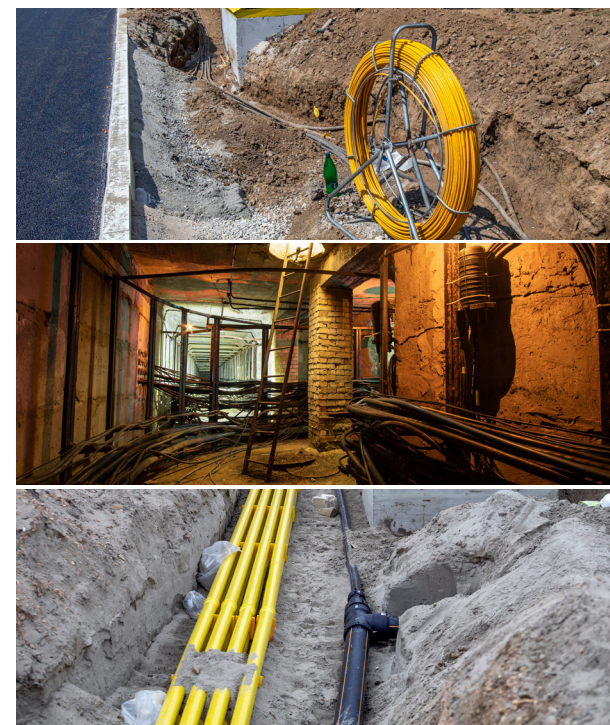
VERIFY DATA LINK PATHS

Precisely determining the location of buried fiber data links is critical for preventing accidental excavation damage, facilitating repairs, maintaining accurate infrastructure maps, and ensuring effective security measures. Original planning documents often differ from as-built installations due to field modifications, route deviations, or undocumented repairs, making actual verification essential. The FP1150 can be used to verify the location of a fiber optic conduit by monitoring a dark fiber while impacting the ground above the presumed location of the conduit.

DETECTION RANGES

The achievable detection ranges for the detection of digging and the presence of heavy vehicles will depend on the depth of the cable carrying the detection fiber, the specific design of the conduit, and on the level of background activity at any particular location (vehicular and pedestrian traffic, for instance). The quieter the background, the more sensitive the system can be set (resulting in increased detection ranges). In quiet environments with minimal background activity, detection ranges for digging and heavy vehicle presence can be up to 20 m (66 ft).

The FiberPatrol FP1150's detection parameters provide flexibility in tuning the detection sensitivity on a zone-for-zone basis, ensuring the protection offered by the system is optimized over the full length of the communications cable.



FiberPatrol FP1150 can protect fiber optic communication links installed in a variety of methods, including direct burial, legacy service tunnels, and mixed-use buried conduits.

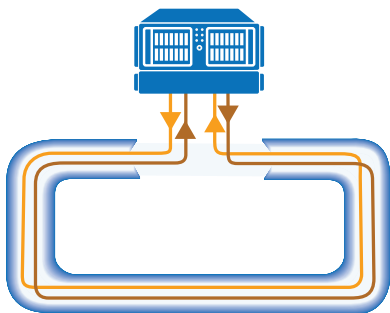
SENSOR CABLES

The FP1150 works with single-mode fiber within standard telecommunications-grade cable. The sensing function requires one fiber—additional fibers within the cable can be used for other communications purposes. Existing buried fiber cable may be used if it meets the required performance specifications (see the specifications section for details).

CUT IMMUNITY

If the data line is cut, the FP1150 immediately reports the incident, including its exact location. Moreover, the system retains the ability to detect and localize intrusions up to the point of the cut. When installed in the cut-immune configuration, the system continues to provide detection on the full data link even after a cable cut.

The maximum length in the cut-immune configuration is 40 km (24.8 mi).



FIELD-ADJUSTABLE DETECTION SETTINGS

The FP1150 uses sophisticated algorithms to discriminate between real threats and vibrations from incidental sources. The advanced detection algorithms incorporate disturbance magnitude thresholds, spatial parameters, and timing parameters. The FP1150's algorithms are easy to configure, enabling facility personnel to optimize individual data line segments for specific conditions.

VEHICLE DETECTION AND OPTIONAL REJECTION

The FP1150 is capable of detecting vehicles in the vicinity of the sensor fibers due to the vibrations created by their motion or by the engine. In the case of a road parallel to the protected asset the FP1150 can be configured to reject normal vehicle traffic and only raise an alarm if a vehicle drops below a configurable speed setting or stops altogether.

MIXED APPLICATION INSTALLATIONS

The FP1150's versatile distributed sensing architecture enables a single unit to simultaneously protect both buried data lines and perimeter fences, maximizing infrastructure security while minimizing equipment costs. By splitting the optical fiber into multiple zones—with some segments running through underground conduits alongside critical data links and other segments attached to perimeter fencing—operators can create a comprehensive security solution from a single interrogator unit.

At the transition point between data conduit protection sections and fence detection sections, a 30-meter (100 ft) buffer coil of sensor cable is recommended.

ALARM DISPLAY OPTIONS

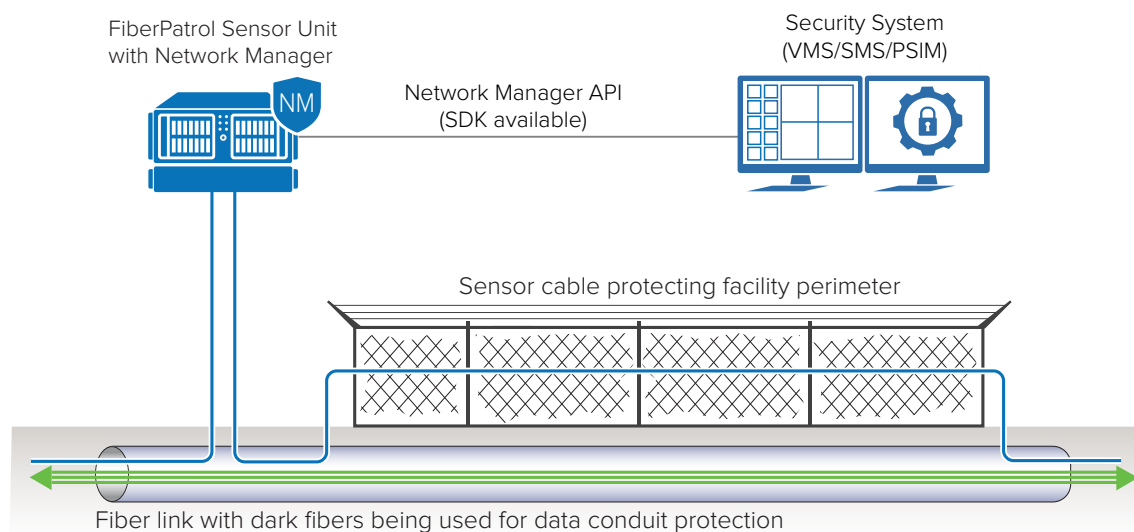
Several options are available for TPI event display and integration with third-party devices. Customers requiring a single display dedicated to FP1150 perimeter monitoring can use the processor's built-in alarm display. The Senstar Symphony Common Operating Platform provide advanced capabilities for those requiring a full-featured security management system.

The FP1150 can report TPI event locations to external systems by zone number, cable distance and/or GPS coordinates linked to GIS maps.

OPEN INTERFACES, EASY INTEGRATION

FiberPatrol FP1150 has well-established integrations with virtually all major VMS/SMS platforms. In addition, Senstar provides a field-tested SDK that enables new integrations to be developed quickly, ensuring support for new features and platforms.

Alarms, events and equipment operational status can also be presented on relays or open-collector outputs using Senstar's UltraLink relay modules.



KEY SPECIFICATIONS

- FP115040U:
 - up to 50 km (31.06 mi.) of TPI detection processing per sensor channel, 100 km (62.1 mi) total
 - maximum allowable cable loss (installed): 12.0 dB @1550 nm per sensor channel
- FP115005U:
 - up to 5 km (3.1 mi.) of detection processing per sensor channel, 10 km (6.2 mi) total
 - maximum allowable cable loss (installed): 4.8 dB @1550 nm per sensor channel
- Sensor Unit MTBF: greater than 87,000 hours
- Detection accuracy: ± 4 m (13 ft) typical
- Up to 1,440 software-definable detection zones
- Pd: 95% typical
- FAR: less than 1/km/month typical, NAR: site dependent
- Detection resolution (minimum separation for two disturbances to be reported separately):
 - 15 m (50 ft) in non cut-immune configuration
 - 30 m (100 ft) in cut-immune configuration
- Cut cable response
 - Cable cut detected and location reported to ± 30 m (100 ft)
 - Operation continues up to the point of the cut

PART	DESCRIPTION
FP115005U	FP1150 Sensor Unit capable of providing up to 5 km (3.10 mi) of detection processing on each of its two sensor channels, up to 10 km (6.21 mi) in total. Price includes a baseline 1000 meters of activation license, the detection capabilities of the Sensor Unit can be extended with additional separately-purchased activation licenses
FP115040U	FP1150 Sensor Unit capable of providing up to 40 km (24.8 mi) of detection processing on each of its two sensor channels, up to 80 km (49.7 mi) in total for perimeter protection applications. Up to 100 km total for TPI applications. Price includes a baseline 5000 meters of activation license, the detection capabilities of the Sensor Unit can be extended with additional separately-purchased activation licenses
FP-PML-05 (B)	Add-on per-meter activation license applicable to FP115005U Sensor Unit. The number of meters licensed needs to cover all cable beyond the initial lead-in section (max 500 m) including all service loops, isolation loops, gate bypasses, etc. Initial lead-in in excess of 500 m needs to be added to the licensed section. Each meter licensed activates both sensor channels. "B" licenses are required for buried applications
FP-PML-40 (B)	Add-on per-meter activation license applicable to FP115040U Sensor Unit. The number of meters licensed needs to cover all cable beyond the initial lead-in section (max 500 m) including all service loops, isolation loops, gate bypasses, etc. Initial lead-in in excess of 500 m needs to be added to the licensed section. Each meter licensed activates both sensor channels. "B" licenses are required for buried applications
FPMA0922-002	FiberPatrol fiber connection module for FP1150 systems. Includes two patch cords, two end modules, associated splice trays, and 1U rack-mount splice enclosure
GB0296-17	17 in 1U rack mount KVM (KB/LCD/Mouse)
FPKT0400-001	8 port KVM switch with 2 sets of cables
FPMA0222-001	Dual End module for FiberPatrol FP1150
FPKT0201-001	Field splice enclosure, 4 cable ports, in-line. Includes grommet kit and splicing supplies for 24 splices
FPKT0211-001	Optional low-profile splice tray for use with field splice enclosure FPKT0201-001, 24-splice capacity
GH1080-08	3/16" x 8" (0.48 x 20.3 cm) stainless steel cable ties (100 each)
GX0310	Tool – manual tension and cut-off tool for stainless steel cable ties
GM0748	Buried vault for buried cable splices and service loops, 100 x 75 x 45 cm
FPKT0500-001	Sensor cable management kit for swinging gates. One (1) section of 5 cm (2 in) diameter split conduit 1 m (3 ft) long and two (2) hose clamps
FPSP0424-001	Unarmored fiber optic sensor/lead cable, 24 fibers, recommended for fence or wall-top applications
FPSP1624-001	Single-armor, single-jacket fiber optic sensor/lead cable, 24 fibers, recommended for buried applications
00FG0220-XXY	Network Manager service version on USB drive
00SW0261-XXY	NMS-GSC Gateway. Gateway software integrating Senstar Network Manager (NM) to Genetec Security Center
00SW0280-XXY	NMX-XProtect Gateway. Gateway software integrating Senstar Network Manager to Milestone XProtect
00CD0100-001	Universal documentation package on USB - includes Universal Configuration Manager (UCM) software

For information on individual system components refer to the respective Technical Specification.