

SENSTAR® FiberPatrol® FP1150 for Perimeter Applications

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Features and Benefits

- Detect and locate perimeter intrusions over a distance of up to 80 km (49.7 mi)
- Pinpoint intrusions with a ± 4 m (13 ft) accuracy
- Accurate locating of multiple simultaneous intrusions
- Sensor cable continues to operate up to the point of a cut
- Dual sensor channels
- 100% operational after a cable cut in cut-immune configuration; maximum perimeter 40 km (24.8 mi)
- Classification algorithms for fence-climb, fence-cut, manual digging, machine digging, engine noise, and vehicle motion
- High Probability of Detection (Pd) and low Nuisance Alarm Rate (NAR)
- Up to 1,440 software-configurable detection zones
- No outdoor power, grounding, or communication infrastructure required
- EMI and lightning immune
- Field components intrinsically safe
- Alarms 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 - nothing outside but fiber-optic cable
- Can host Senstar Network Manager to minimize cyber vulnerabilities
- Possible to use sensor cable with fire ratings such as LSZH, fire retardant, and fire resistant

Precision locating fiber sensor for fence, wall-top, and buried perimeter intrusion detection applications

FiberPatrol FP1150 provides up to 80 km (49.7 mi) of perimeter protection per processor. It accurately locates intrusions even when there are multiple simultaneous intrusions and in the presence of non-localized environmental noise that would overwhelm the location capability of other long-range fiber optic sensors. The full length of the cable is continuously analyzed and disturbances at different locations are reported independently.

The FP1150's fiber optic sensor technology requires no powered or conductive items in the field, making the sensor completely immune to EMI and lightning and intrinsically safe in the presence of explosive atmospheres.

Its resilient reflectometry-based design using coherent Rayleigh scattering allows detection to continue right up to the point of a cut in the sensor cable.

DETECTION SETTINGS

The FP1150 uses sophisticated classification algorithms to discriminate between real threats and vibrations from incidental sources. Detection algorithms incorporate adaptive disturbance magnitude thresholds, spatial parameters, signal patterns, and timing parameters. Its advanced software allows detection settings to be independently optimized for fence, wall-top, and buried sections of a perimeter. Algorithms are easy to configure, enabling facility personnel to optimize the system for site-specific conditions.

CUT IMMUNITY

When the sensor cable is cut, either accidentally or in an attempt to defeat the sensor, the FP1150 immediately reports the incident, including its exact location. Moreover, the sensor retains the ability to detect and localize intrusions up to the point of the cut. When installed in the cut-immune configuration, the sensor continues to provide detection on the full perimeter even after a cable cut. The maximum perimeter length in the cut-immune configuration is 40 km (24.8 mi).

POINT DISTURBANCE DISCRIMINATION

FP1150 differentiates between point disturbances caused by real intrusions and spatially distributed environmental disturbances like wind, heavy rain, and hail. Unlike a block sensor, where all events are aggregated together along the entire zone length (including ones caused by distributed environmental conditions), FP1150 divides the perimeter protected into logical cells and intrusion signals are evaluated independently for each cell.

ENVIRONMENTAL COMPENSATION ALGORITHM

FP1150's Environmental Compensation algorithm further mitigates the effects of wind, heavy rain, and hail. Using its precision locating capability, FiberPatrol accounts for the background environmental noise level in the vicinity of a disturbance before declaring an alarm.

SENSOR CABLES

The FP1150 uses 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 like Ethernet and/or Senstar's proprietary Silver Network protocol for communication with other Senstar sensors.

For standard fence-detection applications non-armored cable is recommended. For buried perimeter application or for installation on concertina coils single-armor double-jacket cable construction is recommended.

CLASSIFICATION ALGORITHMS

To provide optimum Probability of Detection vs. Nuisance Alarm Rate performance and situational awareness

FiberPatrol FP1150 provides an extensive set of classification algorithms:

- for fence applications, separate fence-climb and fence-cut detection algorithms enable the detection of stealthy fence cutting attempts without compromising NAR performance
- for buried applications – footstep, manual digging, machine digging, vehicle engine, and vehicle motion

FENCE APPLICATIONS

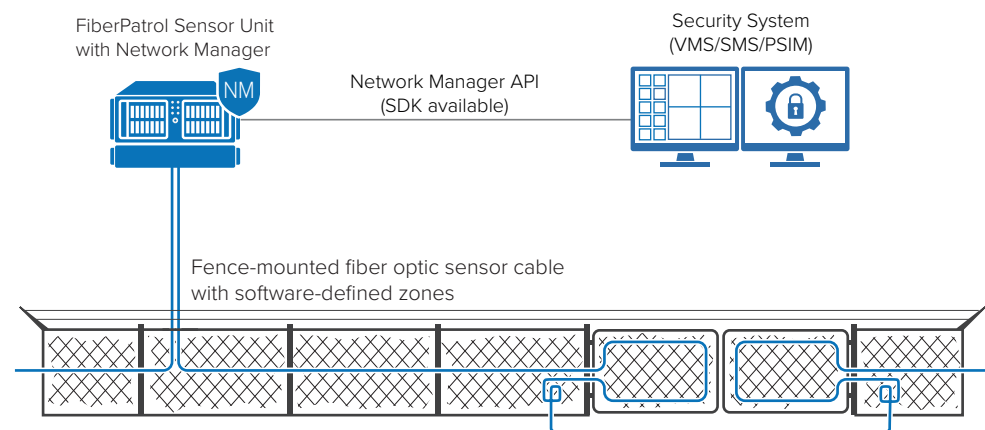
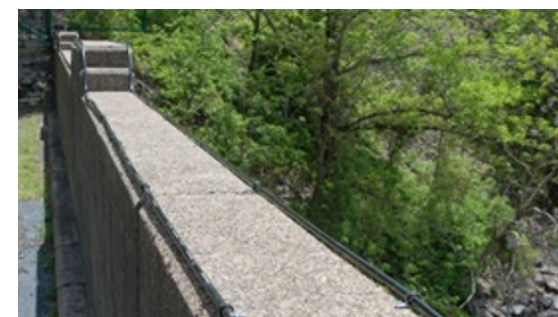
The FiberPatrol FP1150 can be used on most types of metallic fences including chain-link, welded mesh and expanded metal. A single pass of sensor cable provides effective protection for fences up to 4.3 m (14 ft) in height. The sensor may also be used on palisade-style fences depending on the specific characteristics of the fence. The sensor cable can be mounted on swinging gates to provide gate protection.

The FP1150 provides separate detection settings for fence climb and fence cut.

For planning purposes, it is recommended to budget 20% sensor cable over the fence length for use in service loops, extra coverage at brace and corner posts, gate areas, and zone isolation loops.

WALL-TOP APPLICATIONS

For walled perimeters the FP1150 sensor cable is mounted at the top corners of the wall using Senstar's custom extended P-clip fastener. Any impact to the sensor cable by an intruder's hands, feet, or climbing aid will be detected by the system. For highest security the sensor cable can be installed on both the inner and outer sides of the wall.



Fence protection site configuration

BURIED APPLICATIONS

When an intruder moves across the ground above a buried fiber optic sensor cable, whether walking, running, or crawling, characteristic vibrations are created. The system distinguishes these from background vibrations, and the FP1150 declares an alarm.

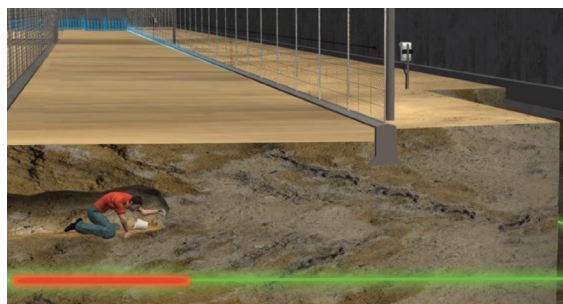
The FP1150 not only detects soil compression and displacement in the vicinity of the buried sensor cable but also the minute seismic waves induced by human footsteps. The high sensitivity of the FP1150 provides flexibility in the burial depth of the sensor cable, enabling the system to not only detect footsteps directly above the sensor cable, but also those up to several meters away.

VEHICLE DETECTION AND OPTIONAL REJECTION

The FP1150 is capable of detecting vehicles in the vicinity of the sensor cable 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.

DIGGING AND TUNNELING DETECTION

The FP1150 detects hand and machine digging and tunneling at distances of up to 20 m (66 ft) from the sensor cable in any direction. The sensor cable can be positioned several meters underground if necessary to extend coverage down to the required depth. Activities inside an existing tunnel such as movement of people, equipment, and vehicles can also be detected.



BURIED DETECTION - INSTALLATION RECOMMENDATIONS

For detection of above ground activity the sensor cable is recommended to be direct-buried at a depth between 15 to 70 cm (6 to 28 in). For detection of tunneling a burial depth of at least 2 m (6.5 ft) is recommended to minimize the response to incidental sources of vibration. Due to the potential for nuisance alarms from incidental vibrations, the best performance for buried applications is achieved when the sensor cable is installed 6 m (20 ft) or more away from trees, fences, and posts, and 30 m (100 ft) or more from roadways.

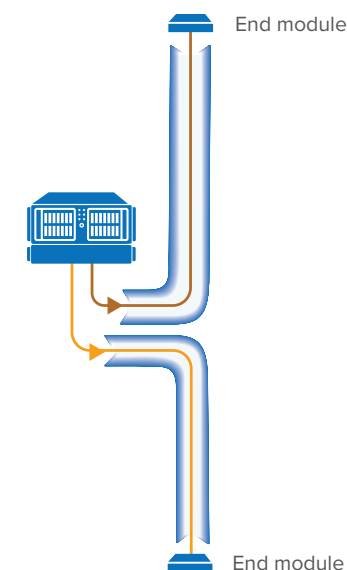
BURIED DETECTION - TYPICAL DETECTION RANGES

Typical detection ranges are shown in the table below. It is important to note that actual performance will depend on specific site conditions and can increase or decrease considerably from these typical values. Factors that can affect achievable detection ranges include:

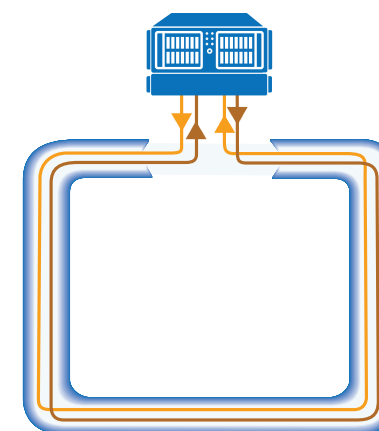
- Nearby incidental sources of vibration
- Burial medium type (clay, gravel, sand, etc.), moisture content, and compaction level
- Presence of distinct layers within the burial medium
- Amount of vegetation

Typical detection ranges can vary from location to location at a given site and can vary over time depending on the moisture content and the depth of frost penetration.

| INTRUSION TYPE | TYPICAL DISTANCE FROM CABLE FOR DETECTION |
|--------------------------------|---|
| Human - Normal Walking | 1 to 5 m (3 to 16 ft) |
| Human - Running | 5 to 10 m (16 to 33 ft) |
| Human - Crawling Slowly | 1 m (3 ft) |
| Light Vehicle - Moving | 3 to 10 m (10 to 33 ft) |
| Heavy Vehicle - Moving | 10 to 20 m (33 to 66 ft) |
| Heavy Vehicle - Engine Running | 5 to 10 m (16 to 33 ft) |
| Manual Digging (pickaxe) | 10 to 20 m (33 to 66 ft) |
| Tunnel Digging | 20 m (66 ft) |



Independent sensor configuration



Cut-immune configuration

TRANSITIONING BETWEEN INSTALLATION TYPES (FENCE, WALL, BURIED)

At the transition point between different installation types – fence, wall-top, buried - a 30 m (100 ft) buffer coil of sensor cable is recommended.

ALARM DISPLAY OPTIONS

Several options are available for alarm 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. Senstar's StarNet™ 2 and Senstar Symphony™ systems provide enhanced capabilities for those requiring multiple workstations and maps as well as the management of additional security equipment. The FP1150 can report alarm locations by zone number, cable distance and/or GPS coordinates.

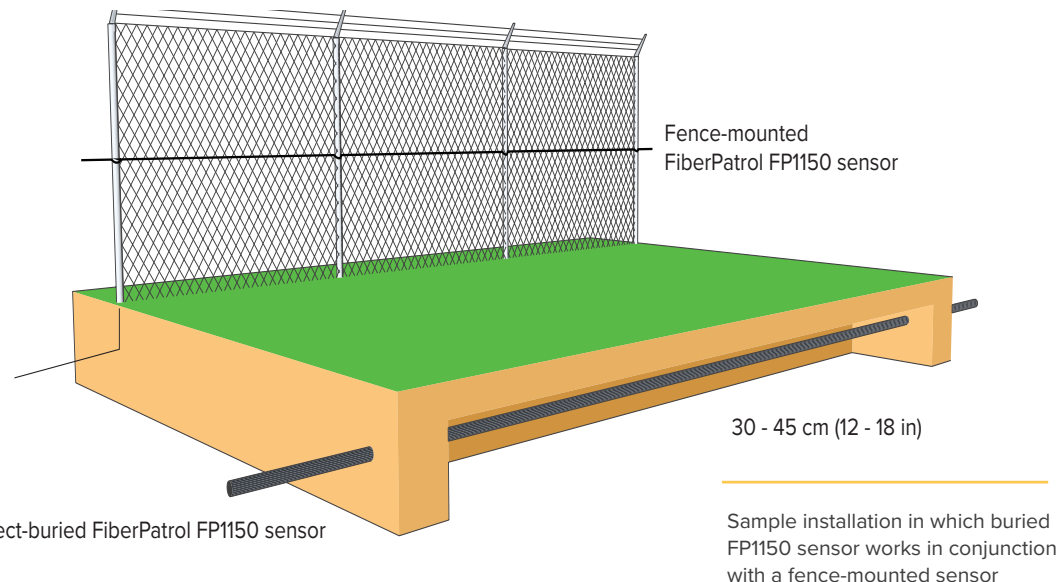
THIRD-PARTY INTEGRATION

Senstar's Network Manager software is used to integrate the FP1150 with security management systems and video management systems. The Network Manager software provides an IP-based interface to the FP1150 that is common to Senstar's other industry-leading sensors, including the OmniTrax® buried RF cable sensor, Senstar LM100 hybrid perimeter intrusion detection and intelligent lighting system, XField® electrostatic sensor, UltraWave™ microwave, FP400 fiber-optic sensor, and the FlexZone® cable-based fence sensor.

Alarms and status can also be presented on relays or open-collector outputs using UltraLink I/O modules.



FP1150 processor



CYBERSECURITY PROVISIONS

The FP1150 Sensor Unit has been cyber penetration tested to ensure that exposure to malware and cyber attacks is minimized. In addition, running Senstar's Network Manager software on the Sensor Unit further minimizes cyber hazards. The Network Manager allows the network attack surface to be reduced to the single IP port required for communication to the customer's VMS/SMS/PSIM. This network connection is further protected by the use of TLS 1.2 to provide an authenticated and encrypted connection and by the use of an IP Allow list whereby Network Manager will only accept TCP/IP connections from authorized IP addresses.

KEY SPECIFICATIONS

- FP115040x
 - up to 40 km (24.8 mi.) of detection processing per sensor channel, 80 km (49.7 mi) total
 - maximum allowable cable loss, installed, of 9.6 dB @1550 nm per sensor channel
- FP115005x
 - up to 5 km (3.1 mi.) of detection processing per sensor channel, 10 km (6.2 mi) total
 - maximum allowable cable loss, installed, of 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
- Simple integration with SMS/VMS systems
- 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
- Pd: 95% typical
- FAR: less than 1/km/month typical
- NAR: site dependent
- System integrity features:
 - sensor Unit MTBF: 87,000 hours
 - dual 1 GbE Ethernet ports
 - redundant hot-swappable power supplies
 - optional redundant Sensor Unit configuration



National Protective
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| 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 pipeline or conduit 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 |
| FP115005H | Equivalent to FP115005U but with fiber connections compatible with FP1100X/FP1400/FP6100X systems |
| FP115040H | Equivalent to FP115040U but with fiber connections compatible with FP1100X/FP1400/FP6100X systems |
| FPMA0922-001 | 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 |
| 00SW0240-XXY | NMS-OnGuard Gateway. Gateway software interfacing Senstar Network Manager (NM) to LeneIS2 OnGuard |
| 00SW0261-XXY | NMS-GSC Gateway. Gateway software integrating Senstar Network Manager (NM) to Genetec Security Center |
| 00SW0280-XXY | NMS-XProtect Gateway. Gateway software integrating Senstar Network Manager to Milestone XProtect |
| 00CD0100-001 | Universal documentation package on USB - includes Universal Configuration Manager (UCM) software |
| GB0390 | Replacement power supply module for FiberPatrol FP1150 Sensor Unit |
| FPFG0201-001 | Replacement blank solid-state drive for FP1150 processor unit. Provided in hot-swap tray |
| FPFG0202-001 | Pair of replacement blank 250 GB solid-state disk drives. Software installation and setup sold separately |

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