

OmniTrax®

Ranging buried cable detection sensor

Description – OmniTrax® is the fifth generation, covert outdoor perimeter security intrusion detection sensor that generates an invisible radar detection field around buried sensor cables. If an intruder disturbs the field, an alarm is declared and the location of the intrusion is determined. Targets are detected based on their conductivity, size and movement.

Application – Cables can be buried into a variety of surfaces (ground, grass, concrete) approximately 23 cm (9 in.) below the surface and are completely covert. The cables are robust enough for direct burial in most surfaces. The terrain-following, volumetric detection field is typically 1 m (3.28 ft.) high by 3 m (9.84 ft.) wide by up to 800 m (2625 ft. or 1/2 mile) long per sensor processor. Systems can be standalone or networked for long perimeters whereby sensor cables are connected together to create a continuous perimeter.



Features

- Up to 800 meters (1/2 mile) per sensor processor
- Determines the position of intruders to within ± 1 m (3.3 ft.) with a 95% confidence
- Sensor networking - power and data over cable reduces installation costs and provides inherent data security
- Operates through vegetation (grass, shrubs and trees)
- Insensitive to wind, rain, snow, hail, sandstorms, fog, extreme temperatures, seismic vibration, acoustic, magnetic effects or blowing debris
- Detects and accurately locates multiple simultaneous intrusions
- Low False and Nuisance Alarm Rate (FAR / NAR) and high Probability of detection (Pd)
- Enhanced diagnostic tools - using Universal Configuration Module (UCM)
- Up to 5 processors protecting up to 4 km (2.5 miles) of perimeter for each power connection point
- Up to 32 processors protecting up to 25.6 km (16 miles) of perimeter can be networked on one network loop

Benefits

- Completely covert
- Site aesthetics left unchanged
- Alarm assessment and response can be focused exactly on the point of intrusion
- Tamper proof

Benefits (continued)

- Silver Network™ - enhanced communications
- Graded sensitivity cables - optimal performance
- Operates in wide range of soil conditions
- Lowest Vulnerability to defeat (Vd) of any outdoor perimeter intrusion detection sensor
- A single processor covers twice the length of previous generation systems
- Longer cables, fewer processors = cost-effective

Markets

- Correctional facilities
- Military installations
- VIP residences
- Borders
- Critical commercial / industrial assets
- Utilities
- Petrochemical
- Nuclear power plants / materials storage
- Airports
- Government agencies and laboratories
- Historic / cultural sites
- Communications sites

OmniTrax

Ranging Buried Cable Detection Sensor

How it works

OmniTrax uses ported (“leaky”) coaxial sensor cables to create an invisible electromagnetic detection field. The cables are designed with apertures in the transmit cable’s outer conductor which allow energy to escape and be received by the corresponding parallel receive cable. OmniTrax uses a patented coded pulse signal technique to determine the exact intrusion location, which can identify multiple intruders simultaneously.

Detection is based on the intruder’s electrical conductivity, size and speed. The Probability of detection (Pd) for an upright 35 kg (77 lbs.), intruder, penetrating through the detection field and moving between 50 mm (2 in.) per second to 8 m (26 ft.) per second is greater than 99%, with 95% confidence. Objects weighing less than 10 kg (22 lbs.) are rejected with a statistical confidence level of 95%. Separate detection thresholds are set on a per meter basis. Any attempt to tamper with the cables, the processor or its enclosure, causes an alarm.

OmniTrax sensor calibration is simple. Walking down the sensor cables while in calibration mode allows the system to automatically adjust to the sensitivity of each meter (3.3 ft.) and thus compensate for site variations. Buried cable installation has never been so easy with calibrated thresholding.

Each OmniTrax processor can divide the perimeter protected by its two cable sets into as many as 50 alarm reporting zones. Zones can be changed at any time by technical personnel using the UCM software.

Ranging technology – a primer

Knowing exactly where an intruder enters the perimeter is vital to assessing the situation and initiating a response. Senstar pioneered buried cable ranging technology with the launch of Guidar in 1976 and has now further refined the technology to locate intrusions with pinpoint accuracy.

Able to locate intruders with pinpoint accuracy.

Ranging technology - features

Calibrated thresholding - separate threshold per meter of cable.

Software zoning - up to 50 zones per processor, easily adjusted.

Pinpoint target location

Precise diagnostics - locate faults and sources of nuisance alarms.

Simplified installation - fewer constraints, installation via cable plough possible.

Ranging technology - benefits

- Reduced installation costs.
- Uniform detection field reduces nuisance alarms.
- Flexibility for any environment.
- Simplifies troubleshooting.
- Source of nuisance alarms accurately located.
- Minimal sensor downtime.
- Support analysis done remotely over secure links.

Integral power and data

In addition to detecting intruders, OmniTrax cables are used to distribute power from a single source to the sensor processors, as well as collect alarm and status data from each processor over the Silver Network for transmission to a control and display system like StarNeT™ 1000. OmniTrax is unique in providing detection, power distribution and data collection over the same set of buried cables. Full redundancy for both power distribution and data collection is also possible.





Sensor cables

Sensor cables carry alarm information and low voltage power throughout the perimeter, saving installation time and money. Cables can provide bi-directional power and communications to provide full redundancy in the event that a cable is cut or damaged.

Sensor cables are available in 3 configurations:

1) OC2 has transmit and receive cables buried in separate trenches and can be spaced from 1.5 to 2 m (4.9 to 6.6 ft.) apart. The maximum spacing results in a detection field of roughly 1 m (3.3 ft.) high by 3 m (9.9 ft.) wide. The actual field size will depend on burial depth, burial medium, cable separation and the threshold settings of the sensor. The cables are graded to extend the cables' range to 400 m (1312 ft.) in length, the longest offered by any buried cable system. The cables can be cut to fit any application. OC2 is typically used in applications that allow for longer cables (cost savings) and / or require wider detection fields compared to SC1 cable. These cables are available in active lengths of 300 m (984 ft.) and 400 m (1312 ft.).

2) SC1 has transmit and receive cables in a single jacket. These cables are used in single trench or single slot applications, thus reducing installation time and expense. The resulting detection field is typically 1 m (3.3 ft.) high and 2 m (6.6 ft.) wide. The actual field size will depend on burial depth, the burial medium and the threshold settings of the sensor. SC1 cables are offered in 50 m (165 ft.) increments up to 200 m (656 ft.).

3) SC2 has transmit and receive cables buried in separate trenches and can be spaced from 1.5 to 2 m (4.9 to 6.6 ft.) apart. The maximum spacing results in a detection field that is typically 1 m (3.3 ft.) high and 3 m (9.9 ft.) wide. The actual field size will depend on burial depth, burial medium, cable separation and the threshold settings of the sensor. SC2 cables are offered in 50 m (165 ft.) increments up to 200 m (660 ft.). SC2 is typically used in applications that require wider detection fields compared to SC1 cable but do not require longer OC2 sensor cables.

Universal Configuration Module (UCM)

The UCM is an easy-to-use software tool that provides real-time feedback for use during OmniTrax calibration and setup. The UCM is Windows® based and can be used on a personal desktop or laptop computer. It is connected directly to the processor using a Universal Serial Bus (USB) interface or through the Silver Network™. The UCM eliminates the need for specialized electronic measurement equipment, greatly reduces the configuration time and effort, and facilitates factory support with its enhanced diagnostic tools.

Silver Network

OmniTrax processors can communicate alarm, status, and configuration information to and from a central control point using an integral networking capability referred to as Silver Network. Senstar's Silver Network uses a loop topology with separate Transmit (Tx) and Receive (Rx) point-to-point links between each OmniTrax processor or other connected Silver Network-compatible equipment. Silver Network is designed to be polled from both ends of the loop, thus providing redundant data paths to the field equipment. Point-to-point links can be EIA-422, single or multi-mode fiber, or over the OmniTrax

sensor cables. The data signal is completely regenerated at each node in the loop to ensure proper signal integrity and reliable data transmission. Running Silver Network over the same cables as OmniTrax saves costs by eliminating the need for a separate perimeter network and provides an inherently tamper-proof communications path.

Communications over Silver Network is managed by a Windows® PC running Silver Network Manager (SNM) software. SNM controls network communications and passes OmniTrax alarm and status information to a control and display system such as StarNet 1000. The interface between the PC hardware and Silver Network-compatible field units, such as the OmniTrax processor, is provided by the Silver Network Interface Unit (SNIU). The SNIU is a 1U rack-mountable unit and provides the choice of USB, Ethernet, and EIA-232 for connecting to the PC. Communication between the SNIU and OmniTrax processors can be EIA-422, multimode fiber or single-mode fiber.

The SNM software provides an interface to third party Security Management System (SMS) software via the Network Manager Interface (NMI). Via the NMI a third party SMS can communicate to the SNM in two ways - either by an exchange of messages at the TCP/IP level or by making calls to the NMI Dynamic Link Library (DLL). To enable third party integration to the SNM software Senstar provides a Software Development Kit (SDK) that includes a detailed Applications Programming Interface (API) document, a network manager simulator, and sample code. With the network manager simulator, a developer has the ability to simulate the full range of OmniTrax sensor and supervision alarms including the ability to define at what range an alarm is to appear. The simulator also covers a wide range of other Senstar products.

Technical Specifications

PERFORMANCE

- Probability of detection (Pd) - Optimized for the detection of an upright 35 kg (77 lbs.), or larger person moving between 5 cm (2 in.) per second to 8 m (26 ft.) per second, with a probability of detection of 99% with 95% confidence. This is based on penetration of the intruder through the detection zone
- False Alarm Rate (FAR) - Fewer than 1 per zone per month alarms from unknown causes with full visual assessment
- Nuisance Alarm Rate (NAR) - Site dependent

PROCESSOR MAIN FEATURES

- Direct digital receiver
- Alarm reporting:
 - Up to 50 functional segments per cable
 - Up to 50 alarm reporting zones per processor
- Relay outputs:
 - Alarm A, Alarm B, Supervision, Fail
 - Form C, 1.0 A 30 VDC max
 - Expandable with relay output card
- Auxiliary inputs:
 - 2 supervised inputs
 - Expandable with universal input card
- Lightning protection:
 - Tranzorb and non-radioactive gas discharge devices on all I/O ports
- USB port

PROCESSOR OPTIONS

EIA-422 communications card

- Mounts on processor expansion header
- Supports two EIA-422 (4-wire) data paths
- True regeneration of signal (removes distortion at each node)
- Every processor in a network configuration requires a communications card

Fiber optic communications cards

- Mounts on processor expansion header
- Supports two fiber optic data paths or one fiber optic data path and one EIA-422 path
- Multimode fiber optic communication card allows distances of up to 2.2 km (7,200 ft.)
- Multimode card fiber card operates at 820 nm, comes with ST connectors and is compatible with 50/125 μm , 62.5/125 μm , 100/140 μm , and 200 μm HCS® multi-mode fiber
- Single-mode fiber optic communication card allows distances of up to 10km (32,000 ft.)
- Single-mode fiber card operates at 1310 nm, comes with ST connectors and is compatible with 9/125 single-mode fiber
- True regeneration of signal (removes distortion at each node)

- Every processor in a network configuration requires a communications card

Input / output card

- Mounts on processor expansion header
- The OmniTrax processor can accept 1 optional input / output card in addition to a communications card
- Relay output card: 8 Form C relay outputs (1.0 A, 30 VDC max)
- Universal input card: 8 inputs with configurable thresholds and supervision modes

Auxiliary power supply

- Accepts 18 to 48 VDC
- Output 12 VDC, 150 mA

PACKAGING / ENVIRONMENTAL

Processor on a base plate in a white aluminum CSA/UL Type 4X enclosure:

- Size - 40 H x 23.5 W x 16.5 cm D (15.75 H x 9.25 W x 6.5 in. D)
- -40°C to +70°C (-40°F to +158°F)
- Relative humidity to 95% non-condensing

Protective telecom enclosure accepts OmniTrax enclosure:

- Size - 98.4 H x 42.5 W x 27.3 cm D (38.8 H x 16.8 W x 10.8 in. D)
- Color - light green enamel over steel
- Protection - IP33

POWER REQUIREMENTS

- 12 to 48 VDC input voltage at less than 9 watts
- Integrated internal 5 Ah battery backup

SENSOR CABLE OC2

- Two pairs of sensor cable per processor
- Contiguous graded design with lead-in and active cable
- Lead-in length 20 meters (66 ft.)
- Active cable length 400 meters (1312 ft.) or 300 meters (984 ft.)
- Cable jacket diameter 12.07 mm (0.475 in.)
- Each cable set comes with a kit of 6 TNC connectors, 42 ferrite beads and marker tape

SENSOR CABLE SC2

- Two pairs of sensor cable per processor
- Contiguous graded design with lead-in and active cable
- Lead-in length 20 meters (66 ft.)
- Active cable lengths of 50, 100, 150 or 200 m (164, 328, 492 or 656 ft.)
- Cable jacket diameter 8.0 mm (0.315 in.)
- Each cable set comes with a kit of 4 TNC connectors and 20 ferrite beads and marker tape

SENSOR CABLE SC1

- Two cables per processor
- Transmit and receive cable in a single jacket
- Contiguous graded design with lead-in and active cable
- Lead-in length 20 meters (66 ft.)
- Active cable lengths of 50, 100, 150 or 200 meters (164, 328, 492 or 656 ft.)
- Cable jacket size 8.5 x 15 mm (0.335 x 0.590 in.)
- Each cable set comes with a kit of 4 TNC connectors, 10 ferrite beads and marker tape

CABLE ACCESSORIES

- Standalone and network decouplers
- Terminator kits / connector tool kits / cable repair kits
- Ferrite beads / connectors

SILVER NETWORK™

- Silver Network Interface Unit (SNIU) - reliable lightning protected computer interface
- Silver Network Manager (SNM) - software interface to "head-end" Security Management System (SMS) such as StarNet 1000 or 3rd party system
 - Provides alarm data including pinpoint target location
 - Provides diagnostic data to support remote UCM operation

SILVER NETWORK™ REPEATERS FOR LONG NETWORK RUNS

- EIA-422 to EIA-422
- Multi-mode fiber to multi-mode fiber
- EIA-422 to multi-mode fiber
- Accepts 12 - 48 VDC
- Built-in battery charger

GENERAL ACCESSORIES

- 48 V outdoor-rated network power supply
- 12 V outdoor-rated single processor supply
- Lightning arrestor kit

The OmniTrax buried cable detection system is protected by US patents 5,914,655 and 5,834,688 (with others pending) and other international patents.

Specifications are subject to change without prior notice.



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