XField®

Terrain-following volumetric sensor

Description – The XField® sensor is a terrain-following volumetric sensor that creates an electrostatic field around a set of 4 or 8 parallel field and sense wires that causes its processor to sense changes when events, such as intruders penetrating the wires, take place.

Application – XField is used in free-standing, fence-mounted, roof and wall applications. The system's tall, narrow, well-contained detection zone allows the sensor to be installed in a wide variety of applications and minimizes nuisance alarms caused by nearby moving objects.

Features

- Direct-to-Digital Signal Processing
- Enhanced digital signal processing algorithms
- 4-wire or 8-wire configurations

Benefits

- Tall, narrow, well contained detection zone
- Meets the requirements of test criteria of USNRC Regulatory Guide 5.44
- A detection zone up to 5.65 m (18.5 ft.) high can be created
- Simple design and easy-to-install
- Immune to 50 and 60 Hz power grid interference
- Local or remote configuration and diagnostics
- Self-cleaning, corrosion resistant hardware
- Easy-to-maintain
- Filters out environmental inputs

Markets

- Nuclear power plants
- Nuclear material storage facilities
- Correctional facilities
- Critical infrastructure sites / facilities
- Data storage centers
- Oil refineries
- Ports of entry
- Chemical / petrochemical industry
- Water treatment facilities

VOLUMETRIC SENSORS - ABOVE GROUND

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How it works

Digital Signal Processing (DSP) analyzes the capacitance of each sense wire independently and uses the amplitude of change (size of the intruder), rate of change (movement of the intruder) and the time the target spends in the detection fields to qualify the alarm.

Configuration

The system can be configured as: a four-wire system (two field wires and two sense wires) generates a field up to 2.5 m (8 ft.) high, 1.0 m (3.3 ft.) wide at the center and up to 150 m (500 ft.) long; an eight-wire system has the same dimensions but with a height up to 5.65 m (18.5 ft.) which is higher than any other sensor of its kind.

Software / mechanical design

New software enhancements lower the nuisance alarm rate caused by environmental stimuli, while increasing the Probability of detection (Pd) in all weather conditions. Through the use of quadrature detection, the DSP is able to distinguish the difference between capacitive changes and resistive changes. Intruders cause small changes in capacitance, whereas environmental stimuli, such as spider webs combined with moisture, cause resistive changes. This means fewer nuisance alarms resulting in higher system confidence.

XField's mechanical design is technically superior to any other electrostatic field sensor on the market. The one-piece insulator / mounting kit is easy-to-install and requires minimal maintenance. The kit is versatile enough to be used in any application. The insulators are an injection molded plastic compound that is strong and corrosion resistant. Their unique shape and composition allows a light rainfall to free the system of potentially troublesome contaminants.

The mounting brackets are rugged in construction and made with galvanized steel and plastic components. The entire system is specifically designed to survive years of outdoor exposure.

XField's advanced signal processing provides an unparalleled degree of discrimination between environmental effects and true intrusions

Inputs / outputs

Each processor has two auxiliary input terminals. When the processor is operated in standalone mode these inputs serve as self-test inputs. In network mode, the processor monitors these inputs, typically two relay inputs from non-network sensors, and sends the information to the Silver Network™ Manager (SNM).

Each processor is equipped with four (4) form C latching relays. In a standalone configuration, the four relays are assigned to alarm A, alarm B, supervision and fail. In a network configuration, the relays can be assigned to the same functions or they can be used as auxiliary outputs for other applications such as turning on lights or activating a siren.

Network options

When used in a network configuration, the processor requires a communication card that plugs into the main board. The processor communicates through the Silver Network Interface Unit (SNIU) to the SNM over dual twisted-pair copper or fiber optic cable. The SNM makes sensor data available to StarNeT™ 1000 or a third-party security management system.

The SNIU is a hardware data translation device that is located in the central control and display area. SNM is software running on a computer. It can be on the same PC as the control and display software (i.e. StarNeT 1000) or it can be on a separate computer that interfaces to a third-party system.

In order to facilitate the integration of auxiliary inputs and outputs into the XField system, the XField processor allows an input / output card to be added. Two options are available: a relay output card providing 8 Form C relay outputs and an 8-channel universal input card with configurable threshold and supervision options (see Technical Specifications).

XField also offers an auxiliary power supply that mounts inside the XField enclosure. The module accepts 18 to 52 VDC and provides 12 VDC at 150 mA.

Universal Configuration Module (UCM)

XField is configured and calibrated using Senstar's Universal Configuration Module (UCM) software. The UCM offers a simple-to-use and powerful user interface. The software runs on any Windows® XP computer and connects to the sensor via the Universal Serial Bus (USB) connector on the processor or via the central computer in a network configuration. The UCM provides installers and maintenance personnel with remote feedback of sensor status.

Silver network™

The external interface to the Silver Network is the Silver Network Manager (SNM) software, which controls network communications and passes alarm location and status information to a control and display system such as StarNeT 1000. The Silver Network Interface Unit (SNIU) is a reliable lightning-protected interface between the SNM and software running on a computer and the XField processors.

Communication between processors and the Network Interface Unit (NIU) is via RS-422, 4-wire data cables or dual multimode fiber optic cables. The data signal is completely regenerated at each processor to avoid data degeneration and termination issues.

Technical Specifications

FEATURES

• Dual 4-wire zone (A and B)
• Maximum zone length 150 m (500 ft.)
• Maximum zone height (fence-mounted)
• 4-wire 2.44 m (8 ft.)
• 8-wire (A & B Stack) 5.65 m (18.5 ft.)
• Software configurable detection parameters
• Supervised field & sense wires
• Two supervised auxiliary inputs used as self-test inputs in standalone mode
• 50 and 60 Hz power grid DSP filtering
• Two self-test inputs (zone A and zone B)
• Zone A and B alarm output relays
• Fail and supervision relay outputs
• All relays are Form C 1.0 A maximum, 30 VAC / DC maximum non-inductive load
• Configurable with UCM software
• Tranzorb and non-isotope gas discharge devices on all I / O ports

PERFORMANCE

Probability of detection (Pd) - Optimized for the detection of an upright 35 kg (77 lbs.), or larger, person moving between 50 mm (2 in.) per second to 8 m (26 ft.) per second, with a probability of detection of 95% with 95% confidence. This is based on penetration of the intruder through the detection zone

Detection zone width - Walk-up detection of a 35 kg (77 lbs.) person at a maximum of 0.5 m (20 in.)

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 OPTIONS

RS-422 communications card

• Direct connection to processor
• Supports two RS-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

• Direct connection to processor
• Supports two fiber optic data paths or one fiber optic path and one RS-422 path
• Multi-mode fiber optic communication card allows distances of up to 2.2 km (7,200 ft.)
• Single mode fiber optic communication card allows distances up to 10 km (32,000 ft.)
• True regeneration of signal (removes distortion at each node)
• Every processor in a network configuration requires a communications card

INPUT / OUTPUT CARDS

• XField processor can accept one optional input / output card in addition to a communications card
• **Relay output card:** 8 Form C relay ouputs (1.0 A maximum, 30 VAC / VDC max)
• **Universal input card:** 8 inputs with configurable threshold and supervision modes

AUXILIARY POWER SUPPLY

• Accepts 18 to 52 VDC
• Output 12 VDC, 150 mA

CALIBRATION DEVICE

Universal Configuration Module (UCM) software running on a PC or laptop

SILVER NETWORK™

Silver Network™ Interface Unit (SNIU) - reliable lightning protected computer interface

Silver Network™ Manager (SNM) - software interface to head-end security management system such as StarNeT™ 1000 or 3rd party system

• Point-to-point interconnection provides reliable communication – no signal degradation as with multi-drop networks
• Communicates over hard-wired RS-422 or multimode fiber optic
• Facilitates fail safe communications through dual data path redundancy

Silver Network™ repeaters for long network runs

• RS-422 to RS-422
• Multi-mode fiber to multi-mode fiber
• RS-422 to multi-mode fiber
• Accepts 10 - 52 VDC
• Built-in battery charger

WET END

• Plastic insulators mount on a fiberglass rods, 61 cm (24 in.) long
• Open design of insulators minimizes opportunities for dirt and insects to collect
• Support brackets are galvanized steel and plastic
• Pole-mounting kits available for a range of pole outer diameters 6 – 11.4 cm (2 3/8 – 4 1/2 in.)
• Can be mounted to walls and rooftops
• Self-cleaning, minimal maintenance
• Wires are 316 stainless steel, bottom two wires are insulated
• Wire tension 23 kg (50 lbs.)

PACKAGING

• Processor on base plate in a white aluminum NEMA 4 (or equivalent) enclosure
• 40 H x 23.5 W x 16.5 cm D (15.75 H x 9.25 W x 6.5 in. D)
• Tamper switch on enclosure door
• Protective telecom enclosure accepts XField NEMA 4 enclosure
  - Size – 98.4 H x 42.5 W x 27.3 cm D (38.8 x 16.8 x 10.8 in.)
  - Material - light green enamel over steel
  - Protection - IP33

ENVIRONMENTAL

• -40°C to +70°C (-40°F to +158°F)
• Relative humidity to 95% non-condensing

PROCESSOR POWER REQUIREMENTS

• 10 - 52 VDC input voltage at less than 6 watts
• Integrated internal battery backup

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Specifications are subject to change without prior notice.

www.senstar.com
ISO 9001:2000
CGSB Registered Certificate 95711
Version: DAS-540-IN-R1-E-06/08

Printed in Canada

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