FIBER FENCE
SECURITY SYSTEM™

For your custom quote see us at www.fiber-fence.com

Detecting intrusions and fence damage over long distances using fiber optic cable.

U.S. Patent # 7,109,873 B2
U.S. Patent # 6,980,108 B1

MANHOLE COVER PROTECTION

COMERCIAL COMPLEXES

CRITICAL MASS PROTECTION

BRIDGES, PIPELINES & RAILS

AGRICULTURE FENCING

AIRPORTS

- **User Installable Option**
- **Safe to use where volatile gasses or materials may be present.**
- **100% immune to the effects of Electromagnet Interference.**

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FIBER FENCE general overview

GENERAL USES

The FIBER FENCE Security System is used primarily for detecting intrusions and fence damage over long distances using fiber optic cable. FIBER FENCE has exceptional monitoring range. Our sensors do not require electricity beyond the Zone Control Unit. That enables our sensors to be used in remote areas without the need for electricity at the sensing location.

FIBER FENCE
Basic Facts

Perimeter protection for a single zone up to 10 miles can be achieved. In perimeter fence line applications, FIBER FENCE operates utilizing a Mouse Trip mounted at regular intervals along the fence line. Fiber optic cable is threaded through the Mouse Trip. When the cable is disturbed there is a reduction in the intensity of the light in the cable. The reduction is detected by the Zone Control Unit and sets off the alarm. Using internet options in conjunction with the optional FIBER FENCE Zone Mapping Software the location of the disturbance is reported.

FIBER FENCE
Main components

Zone Control Unit - Sends light through the fiber optic cable & Mouse Trip

Fiber Optic Cable – Carries the light signal

Mouse Trip Sensor – Activates an alarm when the fence is disturbed

Zone Mapping Software – Displays intrusion location on a map

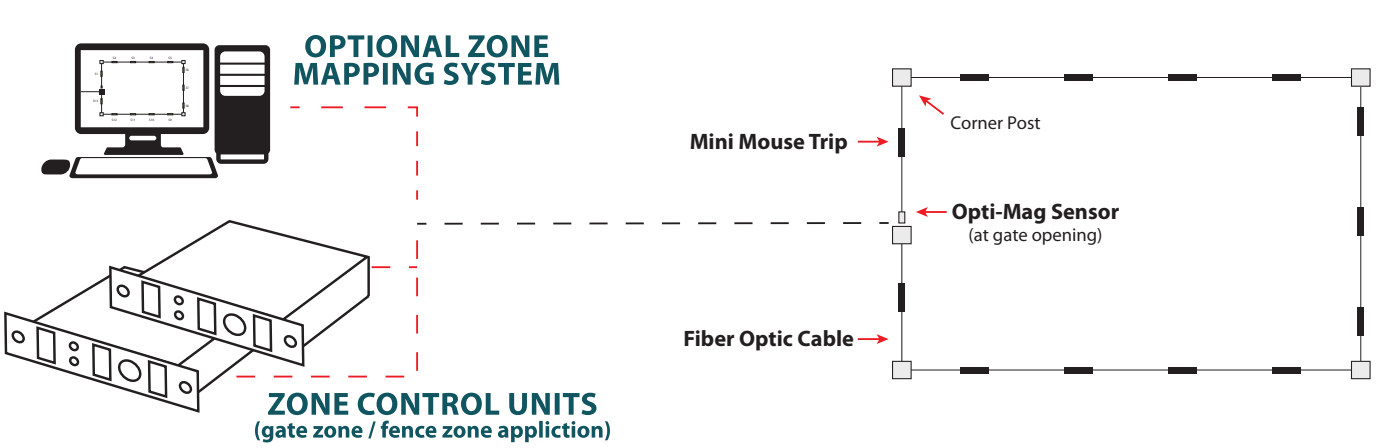
FIBER FENCE DO'S AND DON'TS OF INSTALLATION
(Complete instruction manual provided upon purchase)

DONT'S

- Pull hard on any fiber optic cable especially when unspooling cable along the fence or area to be protected.
- Pull the cable tight around a corner or sharp bend.
- Over tighten a fiber cable to another cable, fence, or object. Make sure the zip-tie, velcro, or twist tie does not exert too much force.
- Cut the cable for ANY reason. Once fiber optic cable is cut, a splice will be required.
- Rush. When working with fiber optic cable and equipment be patient. Taking time in the first place will avoid frustration later on. Follow the installation directions carefully.

DO'S

- Be gentle with fiber optic cable at all times. Remember first and foremost inside the protective jacket are several layers surrounding a glass fiber no larger than a strand of hair. Properly installed, the cable will last for years.



FIBER FENCE components

1 ZONE CONTROL UNIT

This is the heart of the FIBER FENCE Security System. Using a laser, this unit sends light through the fiber optic cable and sensors. When the fiber or a sensor detects an event such as a pull, stress or a break, the amount of light sent back to the Zone Control Unit is reduced causing an alert light and audible alarm. The alert also triggers a relay switch that can provide any number of desired outcomes. As an example, the relay can be included in an alarm circuit to an exterior horn or light system, an automated telephone dial up system, or another security system. There is also a USB Internet Zone Control Unit and software package that can provide alerts on your computer for multiple zones, identify the zone location to expedite the response, and provide email and text alerts.

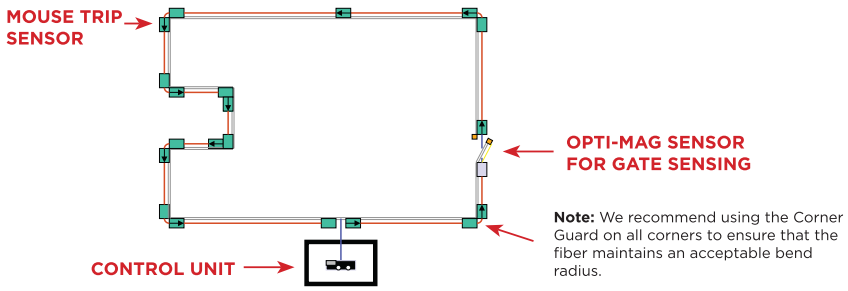
Front Panel View

Rear Panel View

ZONE CONTROL UNIT INSTALLATION OPTIONS

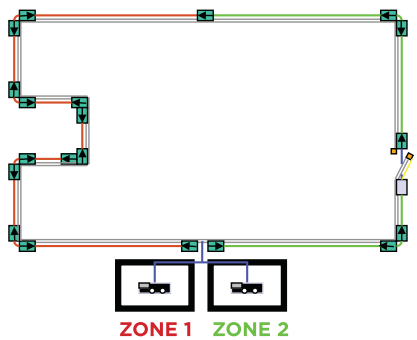
Option 1: Using The Control Unit

This installation is good where there is a need for fence destruction and intrusion protection, and when the identification of the intrusion location is not necessary.



Option 2: Multiple Zone Control Units

This type of installation is best used where perimeters are larger and zone identification is required. Any number of zones may be installed.



Zone Control Unit Specifications

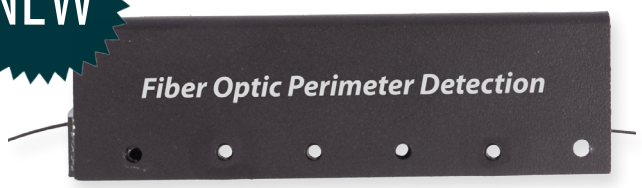
Operating Wavelength	
1310nm	
Optical Connectors	
FC or ST	
Dynamic Range	
23dB*	
Operating Temperature	
0° - 50°C	
Power Requirements	
110VAC 50 - 60Hz	
Operating Voltage	
9Vdc 300mA (Center positive)	
Fiber Type	
Sensing Fiber 9/125µm	

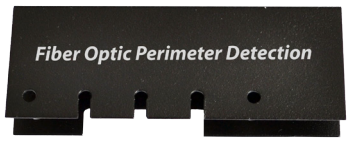
*All specifications tested with 9/125µm sensing fiber

2 MOUSE TRIPS

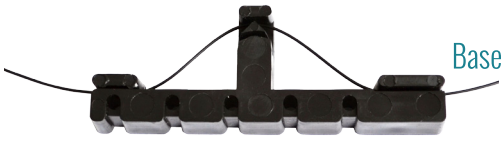
The NEW Mini Mouse Trip is a passive device mounted to the fence line and the fiber. When the fiber is disturbed, it reduces the flow of light. The Zone Control Unit will then set off the alarm. It does not require manual reset at the location, but allows minor disturbances to reset automatically.

NEW





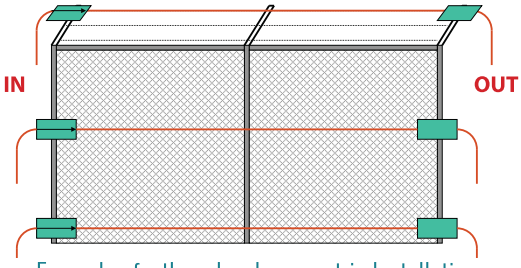
Cover



Base

STANDARD MOUSE TRIP

Mouse Trip Sensor is mounted to the fence and uses a mechanical trip to reduce the flow of light in the fiber. It requires manual reset at the intrusion location.



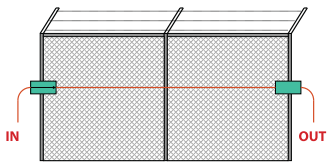
Example of a three level mouse trip Installation

MOUSE TRIP CONFIGURATION OPTIONS

Configuration 1: Single Cable Setup

Detects:
- Fence Destruction
- Vehicular Intrusions
- Fence Theft

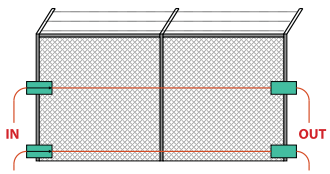
NOTE: IN/OUT MUST LOOP BACK TO THE ZONE CONTROL UNIT.



Configuration 2: Double Cable Setup

(increases sensitivity at bottom)

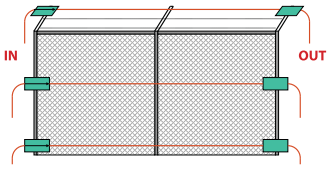
Detects:
- Fence Destruction
- Vehicular Intrusions
- Fence Theft
- Bottom Entry



Configuration 3: Triple Cable Setup

(increases sensitivity at top)

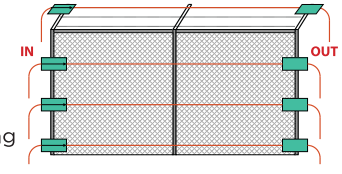
Detects:
- Fence Destruction
- Vehicular Intrusions
- Fence Theft
- Bottom Entry
- Climbing
- Ladder Intrusion



Configuration 4: Multi Cable Setup

(highest Level of Protection)

Detects:
- Fence Destruction
- Vehicular Intrusions
- Fence Theft
- Bottom Entry
- Climbing
- Ladder Intrusion
- Large Hole Cutting



Mini Mouse Trip Specifications

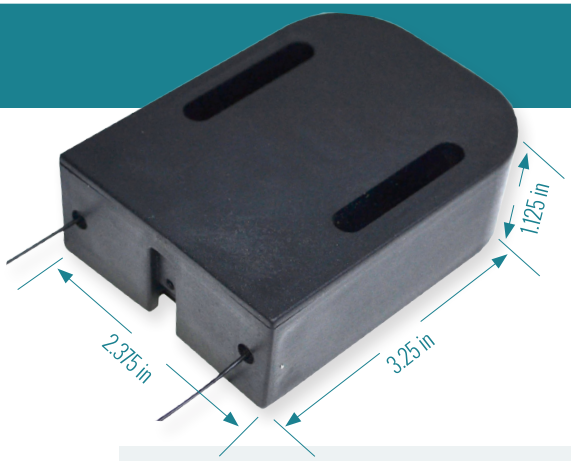
Materials	
UV Protected ABS base; Aluminum Alloy Cover	
Operating Temperature	
-20°C to +60°C (-68°F to +140°F)	
Power Requirements	
None	
Dimensions	
3.75"L X .625"W X 1.625"H	
Fiber Type	
9/125µm	
Mounting Type	
Fencing, Pole, Wall (Concrete or Brick)	

Standard Mouse Trip Specifications

Materials	
UV Protected ABS	
Operating Temperature	
-20°C to +60°C (-68°F to +140°F)	
Power Requirements	
None	
Dimensions	
9.75"L X 3.1"W X 6.00"H	
Fiber Type	
9/125µm	
Mounting Type	
Fencing, Pole, Wall (Concrete or Brick)	

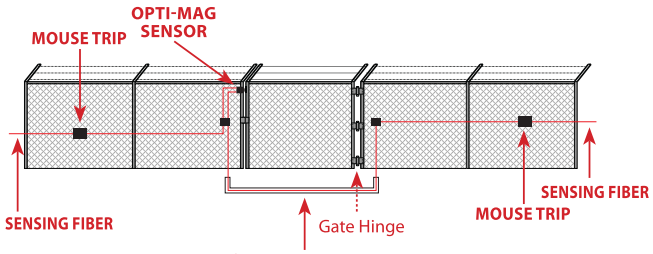
3 OPTI-MAG SENSOR

Opti-Mag Sensors are sealed and contain a powerful internal magnet and spring mechanism that allow light transmission through the fiber only when it is positioned in the specified proximity to the selected magnetic target (ie. gate, door, manhole cover). A metal plate must be installed if there is no metal for the magnet to sense. When the target (metal gate, etc.) is moved away from the sensor, a bend will occur in the fiber optic cable and the event will trigger the alarm. Once the target is returned to its' original position, unrestricted light transmission through the sensor is restored. Each Opti-Mag Sensor is rated for 10,000 cycles and must to be spliced into the fiber fence fiber cable.

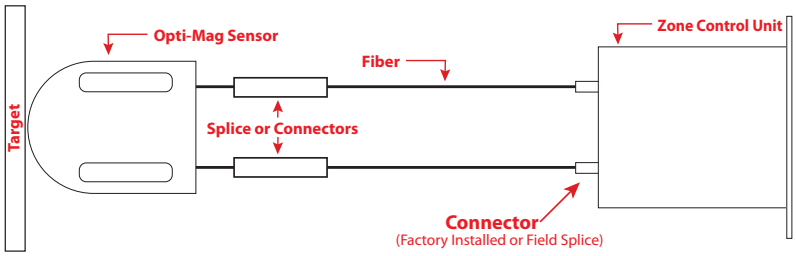


The Opti-Mag Sensor offers long distance, non-spark, gate and cover detection solutions and more...

OPTI-MAG SENSOR GATE APPLICATION

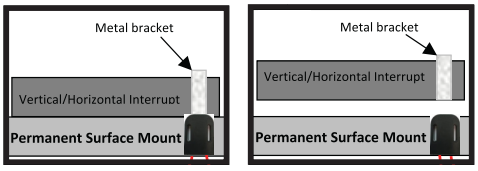


OPTI-MAG SENSOR SCHEMATIC



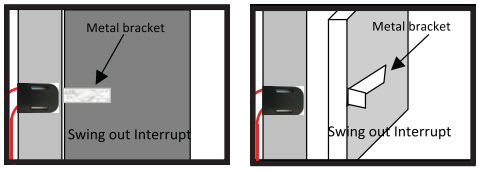
ADDITIONAL OPTI-MAG SENSOR APPLICATION EXAMPLES

Example 1



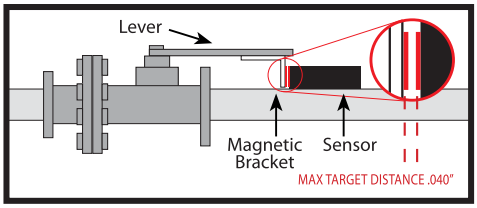
Normal Position | Activated Position

Example 2

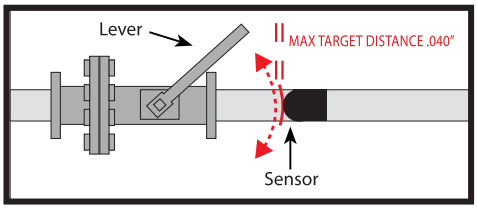


Normal Position | Activated Position

Example 3

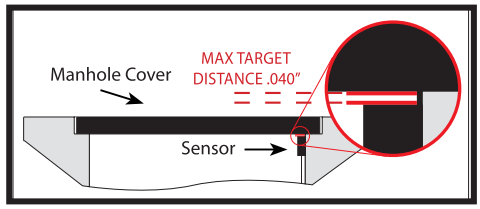


Normal Position (Side View)

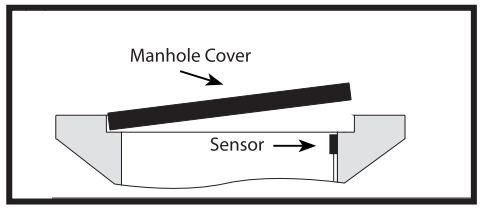


Activated Position (Top View)

Example 4



Normal Position

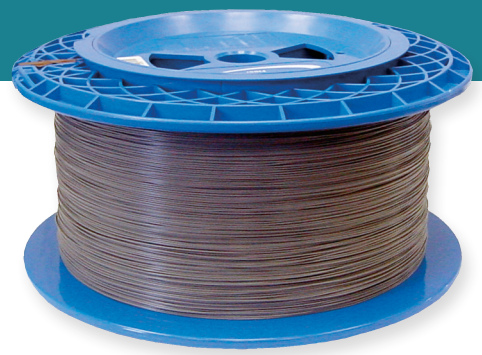


Activated Position

Opti-Mag Sensor Specifications

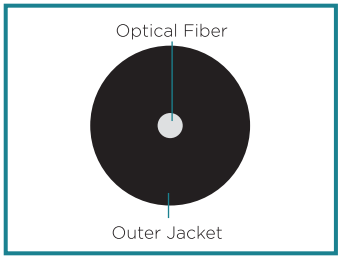
Fiber Type	
9/125, 900Qm UV Resistant Jacket	
Operating Temperature	
-30°C to +63°C (-22°F to +145°F)	
Minium Ferrous Metal Target	
2" x 2" x 1/8" thick	
Dimensions	
3.250"H x 2.375"W x 1.125"D	
Weight	
6.0 ounces	
Maximum Target Distance	
0.04 inches	
Durability	
5000 intermittent cycles	
Housing Material	
Glass Filled ABS	
Attenuation	
1dB	

4 FIBER OPTIC CABLE

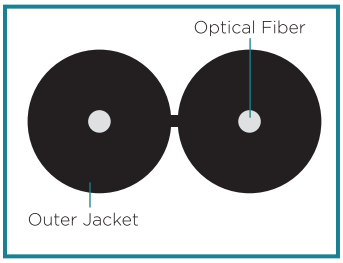


FIBER FENCE Security System utilizes either simplex or duplex bend sensitive fiber optic cable which has a UV protected jacket for a longer life. Shorter lengths of cable that need to be lengthened must be spliced with cable or a patch cord which can be provided. Over estimating length slightly will help avoid using a patch cord. Excess cable must be coiled with no bends.

Please note: If simplex cable is selected for the installation, the fiber optic cable must go to the furthest point, make a loop, and return to the Zone Control Unit. If duplex cable is used, it must be spliced at the end so that it has the equivalent light return back to the Zone Control Unit.



Simplex Cable



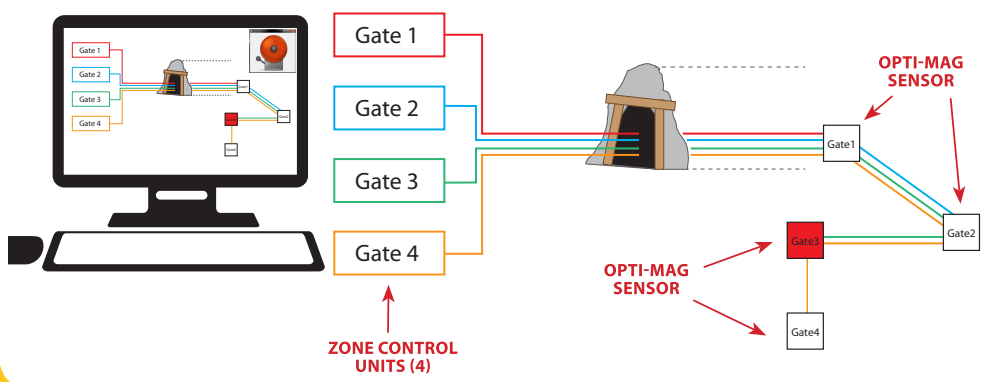
Duplex Cable

5 ZONE MAPPING SOFTWARE

The new Zone Mapping Software allows the user to upload a map from Google Maps or a map scanned into the computer, identify the perimeter, and multiple zones to be protected by FIBER FENCE. In addition to the features built into the Zone Control Unit, the Zone Mapping Software can identify and pinpoint an alarm on the map of the protected area. Zone locations are identified and change color when an alarm is activated. The software will automatically reset when the alarm is cleared.

If the computer being used to monitor the FIBER FENCE site has Internet access, a text or email can also be sent to authorized individuals notifying them about the perimeter alarm.

OPTIONAL MAPPING SOFTWARE



The Zone Mapping Software displays the location of the “tripped” Opti-Mag Sensor on the monitor.

In this diagram is a pictoral of a mine corridor application with gate locations 1, 2, 3, and 4 are shown. The tripped location at sensor #3 has been activated and appears in red indicating a possible intrusion or breach.

FIBER FENCE basic components

1 ZONE CONTROL UNIT

This device sends laser light into the fiber cable detecting the success of the complete loop. When the light in this loop is reduced due to a disturbance with the fence, the Zone Control Unit senses the event and the alarm is activated.

2 MOUSE TRIP

These sensors are designed to be mounted to the fence line. After the Mouse Trip is attached to the fence - at least every 50 feet - cable is attached to the fence using each Mouse Trip. When the fence is compromised the Mouse Trip will apply pressure on the fiber optic cable which creates a light loss activating the Zone Control Unit and setting off the alarm.

3 OPTI-MAG SENSOR

Gate locations require that the fiber optic cable be buried underground. Buried fiber optic cable across a gate span should be enclosed in a conduit to prevent moisture and protect the cable. Using this method, the light path in the fiber optic cable is continuous until the gate is opened. This requires no electrical power at the sensor location.

In addition to gates, the Opti-Mag Sensor can be used on doors, vaults, pole and wall mount enclosures, and manhole covers. The target component material (e.g. gate, lever, switch etc.) to be monitored must be capable of being detected by the magnet in the Opti-Mag sensor. If the target is not magnetic a metal plate can be affixed to the target device.

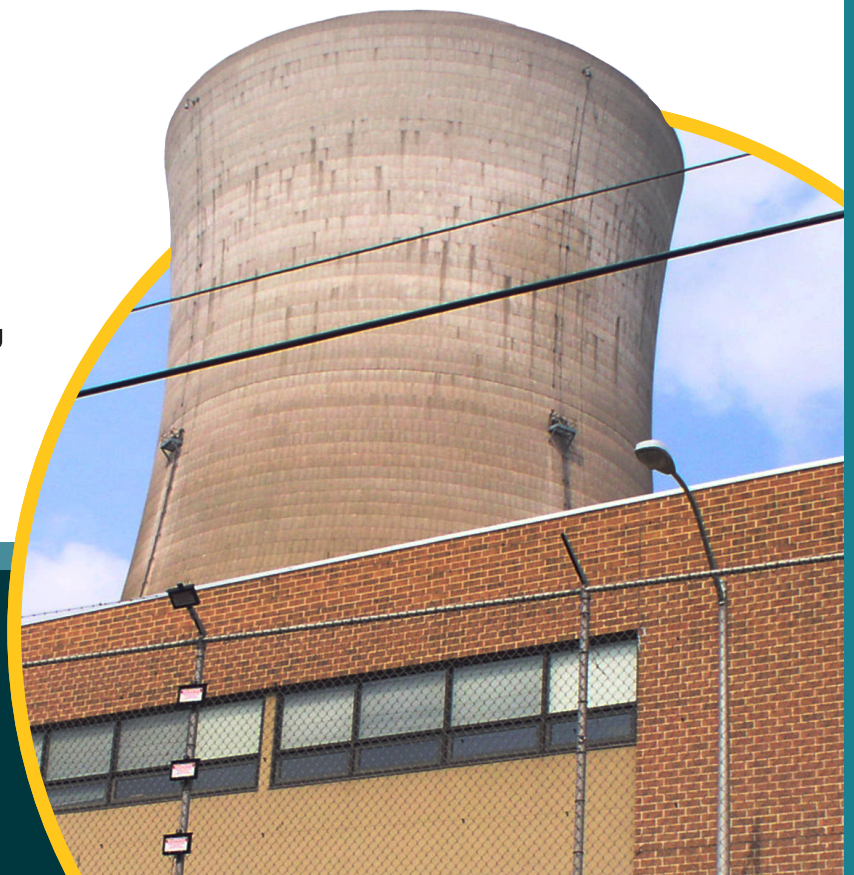
(See additional examples under 3 inside)

4 SIMPLEX AND DUPLEX CABLE

FIBER FENCE can utilize either simplex (one fiber) or duplex (two fibers) bend sensitive fiber cable with a UV protected jacket. If simplex cable is selected for the installation the fiber optic cable must go the furthest point, make a loop and return to the Zone Control Unit. If duplex cable is used, it must be spliced at the end so that it has the equivalent light return back to the Zone Control Unit. When installing either simplex or duplex, around corners the FIBER FENCE Corner Guard is used to ensure that the fiber maintains an acceptable bend radius.

5 ZONE MAPPING SOFTWARE

The Zone Mapping Software is used with the USB Interface on the Zone Control Unit. The software will allow you to monitor an image of the protected area and boundaries on a computer showing the zone locations. In the event of an alarm, the location will change colors and the computer will show a visible and audible alert message. If you have internet access the software can also send an email or a text message when the alert is activated and when the alert is cleared.



OPTIONAL FIBER FENCE ACCESSORIES

Splicing Kit

Unlike a traditional electrical wire security system an intruder cannot easily reconnect or bypass the optical fiber used in the FIBER FENCE Security System.

In the Splicing Kit we provide you with all the necessary products and procedures that will give you the ability to reconnect or preform a splice to repair your system in the field. This can eliminate any additional service cost(s) that an outside technician may charge for repairs. The picture is an example of items contained in the Splicing Kit.

Zone Control Unit Rack

The FIBER FENCE Rack safely and conveniently holds up to four Zone Control Units. Control Units can be installed in the rack upon request.

Corner Guards & Storage Brackets

The FIBER FENCE Corner Guard minimizes light loss by ensuring that the fiber bend angle is correct. To install the Corner Guard you simply mount it directly to the corner of a fence.

When storing lengths of fiber at the start or end of your FIBER FENCE Security System it is recommended that you use Storage Brackets.

Angled Mounting Bracket

The Angled Mounting Bracket is required with the Standard Mouse Trip in installations where top of fence (barbwire) protection is needed.

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