Application Note

Protecting Concertina Wire and Razor Coil Top Guards

SUMMARY

The Fiber Defender series fiber optic intrusion detection system can be deployed successfully to protect coils of concertina wire or razor wire used as top guards in fence line and wall top applications. With correct design and installation, it is possible to achieve a high probability of detection without a high nuisance alarm rate.

INTRODUCTION

In many high security applications, rows of concertina wire or razor coil are used as a top guard in place of, or in combination with, barbed wire. The method for deploying fiber optic sensor cable on concertina or razor wire top guards is similar to the method for installing the sensor cable on chain link or mesh-type fences. The sensor cable is first inserted in protective, flexible conduit and the conduit/cable assembly is then attached directly to the wire coils using stainless steel wire ties. Once installed and connected to an Alarm Processing Unit (APU), the sensor cable detects movement or vibration of the wire coil from intruders attempting to climb or cut through it.

Concertina/razor wire poses a more challenging platform for deployment than fence fabric because of greater movement with wind or vibration. In most instances, only an APU with advanced programmability can be properly calibrated to eliminate or reduce nuisance alarms while still providing a high probability of detection (PD). Therefore, the Model FD-208 or FD-300 series APUs are the recommended systems for protecting razor or concertina wire top guards.

Configuration and Design

Deployment types

As with any intrusion detection system deployment, effective performance begins at the design stage. Based on the required PD and project cost goals, there are two design approaches:

- Daisy-chain sensor cable deployment
- Loopback sensor cable deployment

A *daisy-chain deployment* is the most fundamental and cost-effective method of providing intrusion detection capability. It is accomplished by deploying a single fiber optic sensor cable run from the output of one APU to the input of another (Figure 1).

NOTE:
Daisy-chain deployments are not recommended for Model FD-208 or FD-340 series systems.

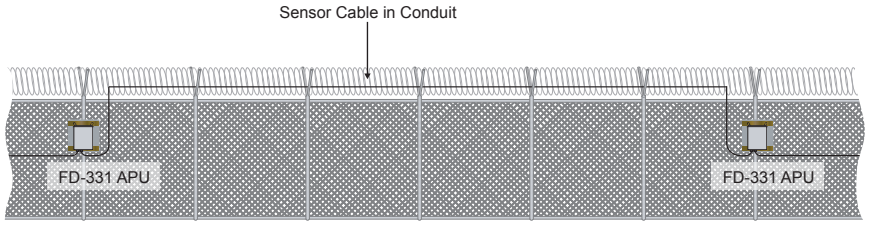

Figure 1 - Daisy-chain deployment on a top guard

For facilities facing higher threat levels, a loopback deployment is recommended. In a loopback deployment, the sensor cable is run from the output of the APU to the end of the zone before returning to the input of the APU to form a closed optical loop (Figure 2).

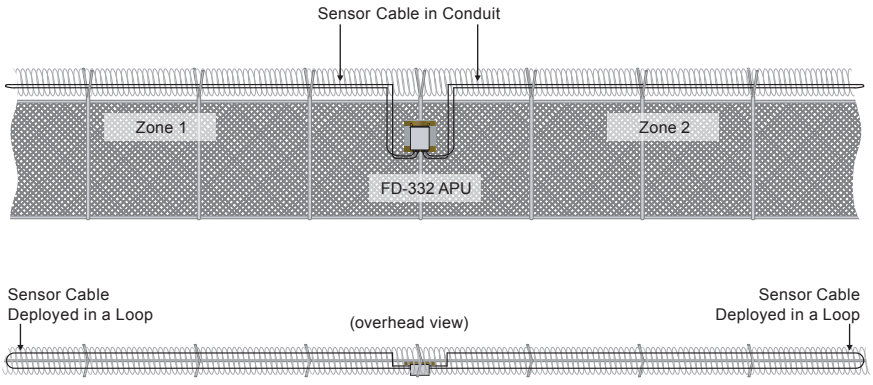

Figure 2 - Loopback deployment

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Advantages of each deployment type

As with daisy-chain deployments, the cable is attached to the inside of the razor or concertina wire coils. Unlike a daisy-chain deployment however, a loopback installation results in more sensor cable per horizontal unit of area, making the system more likely to detect intrusion attempts. This gives loopback deployment the advantage of allowing users to set the system gain (sensitivity) to a lower level, thus reducing the likelihood of nuisance alarms. A loopback deployment also facilitates use of a dual-zone APU.

Using service loops

With both deployment configurations, there must be sufficient cable to cover the protected area and still allow creation of service loops. Service loops are excess lengths of sensor cable added to the cable run at periodic intervals, usually in the form of small, local loops in the cable.

NOTE:
A properly installed service loop measures approximately 0.5 meters in diameter.

Service loops are placed in the perimeter about every 100 meters, ensuring there is sufficient slack in the run in the event the sensor cable must be repaired.

Installation

Inserting cable into protective conduit

Installation of the sensor cable begins by inserting the cable into protective conduit. The sensor cable must be inserted into protective conduit prior to deployment on all perimeter top guards. Installing the sensor cable directly on the top guard without protective conduit is not recommended.

Installation procedure

Following insertion of the sensor cable into the protective conduit:

1. Lay out the sensor cable/conduit assembly next to the zone to be protected
2. Carefully run the sensor cable/conduit assembly through the inside of the concertina wire or razor coils from one end of the protected zone to the other
3. Position the cable/conduit assembly on the “secure” side of the coils (Figure 3). Using stainless steel wire ties, attach the sensor cable/conduit between 90° to 120° down from top dead center of the coils

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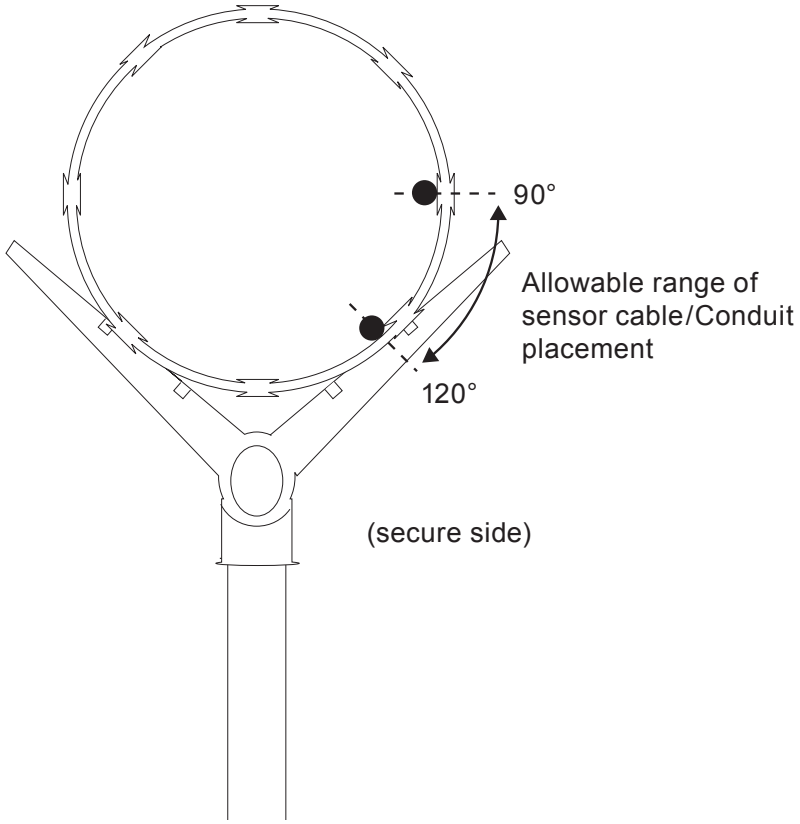

Figure 3 - Sensor cable placement on the top guard coils

Determining best placement of the sensor cable

NOTE:
System requirements must be considered before placing the sensor cable/conduit assembly on the coils. Placing the sensor cable/conduit assembly at the 90° position makes it more sensitive to vibration from intruders yet also more vulnerable to vibration from wind. Placing it at or close to the 120° position makes the system less sensitive but more stable.

4. If the cable conduit assembly is being installed in a loopback pattern, ensure the return strand is aligned on the “secure” side of the coils at a vertical level even with the outgoing strand (Figure 4)

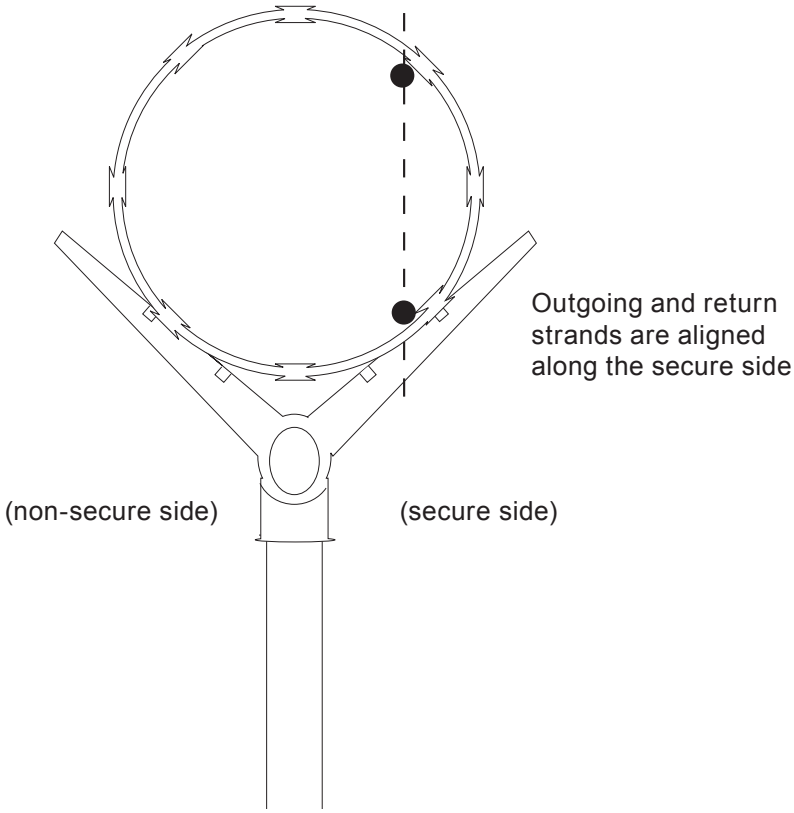

Figure 4 - Sensor cable placement on coils for "loopback" deployments

5. Attach the sensor cable/conduit with stainless steel wire ties at every point where the run intersects the top guard coils
6. Attach the sensor cable/conduit assembly to each top guard mounting bracket with stainless steel wire ties

Attaching conduit

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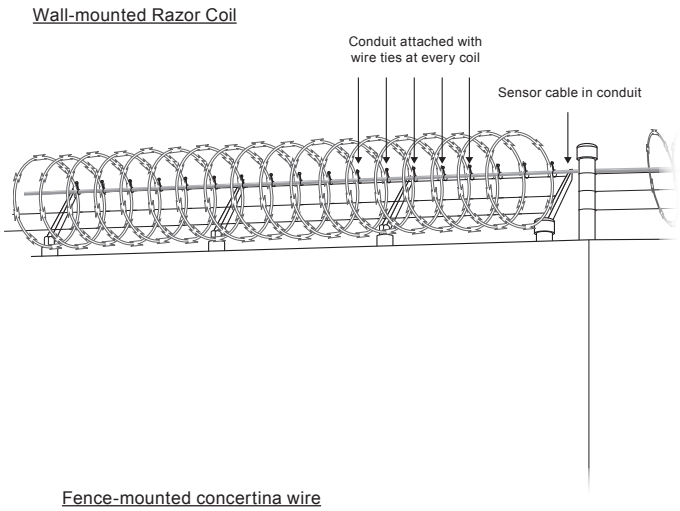
Example Deployment Illustrations

Figure 5 provides two illustrations of sensor cable deployed on concertina wire and razor coil top guards.

Razor coil top guards



Concertina wire top guards

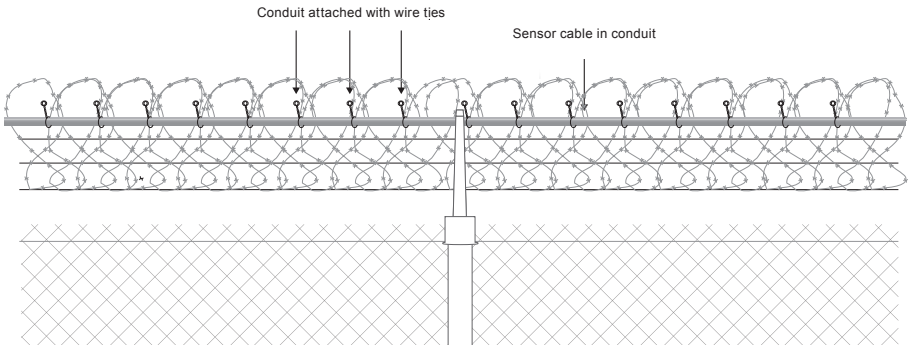


Figure 5 - Example deployment illustrations

For more information about using the Fiber Defender series products to protect concertina wire or razor coil top guards, please contact Fiber SenSys' technical support team at +1.503.692.4430 or by E-mail at info@fibersensys.com.

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