# Application Note

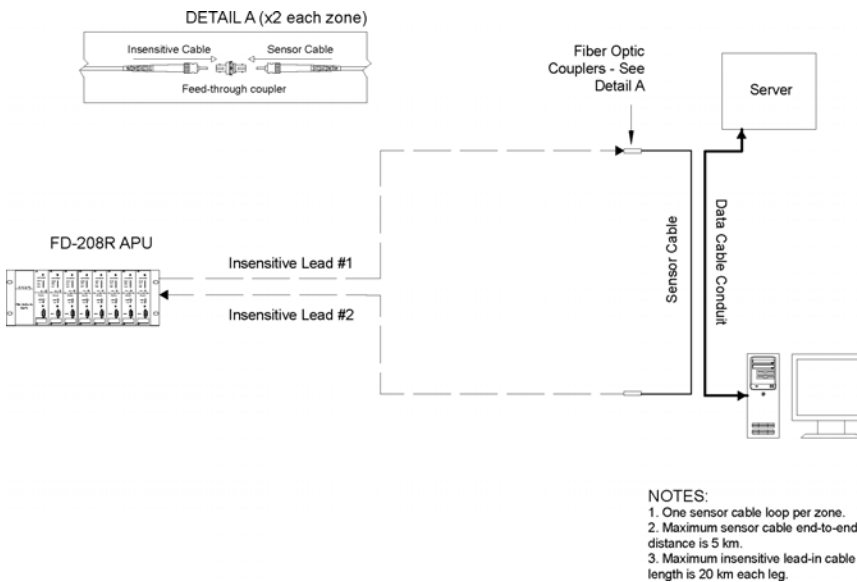## SecurLAN Cable Applications

## SUMMARY

**Protecting data cable conduit from intrusion or sabotage requires careful planning. Deployment of the sensor cable is done using one or more of several sensor cable configurations available through Fiber SenSys. This application note discusses some of the practical options available to the SecurLAN user for protecting data cable conduit effectively with minimal resource requirements.**

## INTRODUCTION

The SecurLAN physical layer data security system is capable of protecting up to 5 kilometers of sensor cable in a single zone. Using the FD-208R as the sensor backbone, each zone can be located up to 20 kilometers away from the alarm processing electronics. This ability gives the SecurLAN system the range necessary to make protecting long runs of data cable in remote regions feasible.

Several fiber optic cable options are available to aid in the deployment of long runs of insensitive lead-in cable. Users may deploy standard IC-3 or IC-4 insensitive fiber optic cable - requiring 2 individual runs of cable (Figure 1).

**Figure 1 -** SecurLAN Sensor Deployment Using SC-3 and IC-3 Cable

DETAIL A (x2 each zone)

Insensitive Cable    Sensor Cable

Feed-through coupler

Fiber Optic Couplers - See Detail A

Server

FD-208R APU

Insensitive Lead #1

Insensitive Lead #2

Sensor Cable

Data Cable Conduit

NOTES:
1. One sensor cable loop per zone.
2. Maximum sensor cable end-to-end distance is 5 km.
3. Maximum insensitive lead-in cable length is 20 km each leg.

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Alternatively, users may deploy one of 3 bundled cable configurations in which the insensitive and sensor cables are bundled together in a plenum-rated jacket.

Three bundled cable configurations are available:

**SecurLAN Retrofit Cable** - Assembly consisting of 1 insensitive fiber optic cable and 1 sensor cable in a common jacket.

**Available Bundled Cables**

**IC-3D Insensitive Duplex Cable** - Cable assembly consisting of 2 insensitive single-mode fiber optic sub cables.

**SecurLAN Backbone Cable** - Assembly comprised of 2 fiber optic sensor cables, 2 insensitive lead-in cables, and four 12-24 strand sub cables for data transmission. This cable assembly is bundled and protected by a helical armor sheath.
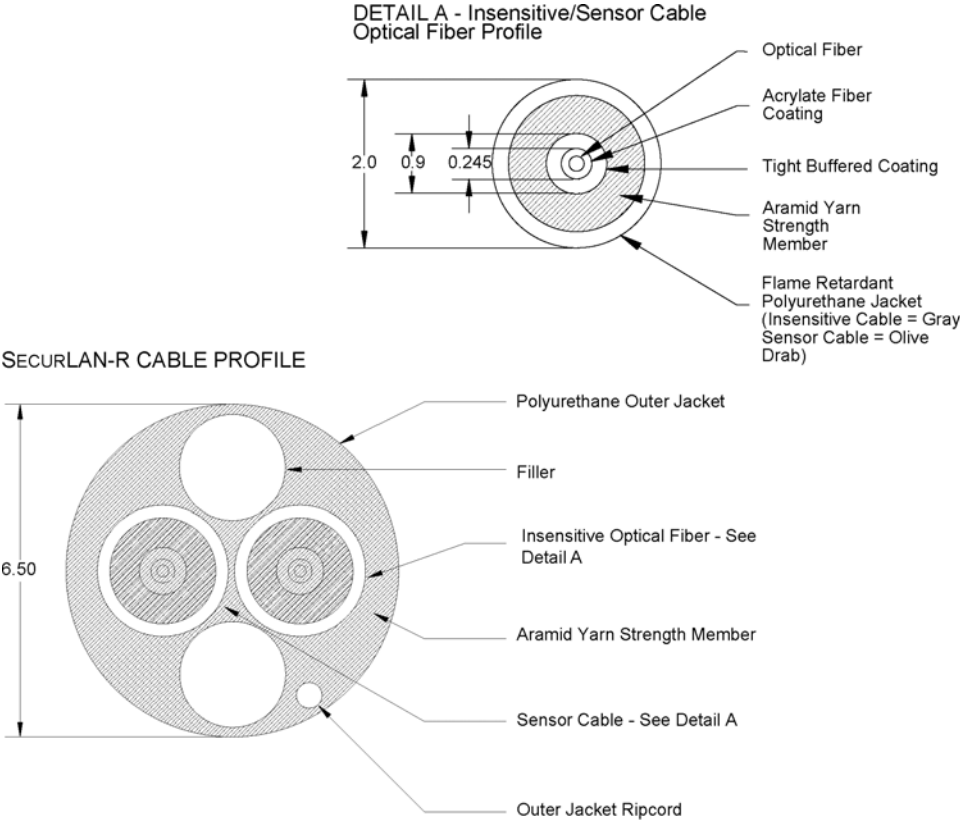
### SECURLAN RETROFIT CABLE (SECURLAN-R CABLE)

The SecurLAN Retrofit cable (Figure 2) provides both the fiber optic sensor and 1 insensitive lead-in cable in the same jacket.

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**Figure 2 -** SecurLAN-R Cable Profile



DETAIL A - Insensitive/Sensor Cable
Optical Fiber Profile

Optical Fiber

Acrylate Fiber
Coating

Tight Buffered Coating

Aramid Yarn
Strength
Member

Flame Retardant
Polyurethane Jacket
(Insensitive Cable = Gray
Sensor Cable = Olive
Drab)

SECURLAN-R CABLE PROFILE

Polyurethane Outer Jacket

Filler

Insensitive Optical Fiber - See
Detail A

Aramid Yarn Strength Member

Sensor Cable - See Detail A

Outer Jacket Ripcord

Notes:
1. All dimensions in mm
unless otherwise noted
2. Drawing not to scale

The primary advantage of the SecurLAN-R cable is its combination of both the sensor cable and insensitive lead-in cable in one jacket, requiring installers to pull just a single cable as opposed to two. This is accomplished by terminating both insensitive and sensor sub-cables and connecting the two together to form an optical loop as shown in Figure 3.

**SecurLAN-R Cable advantages**

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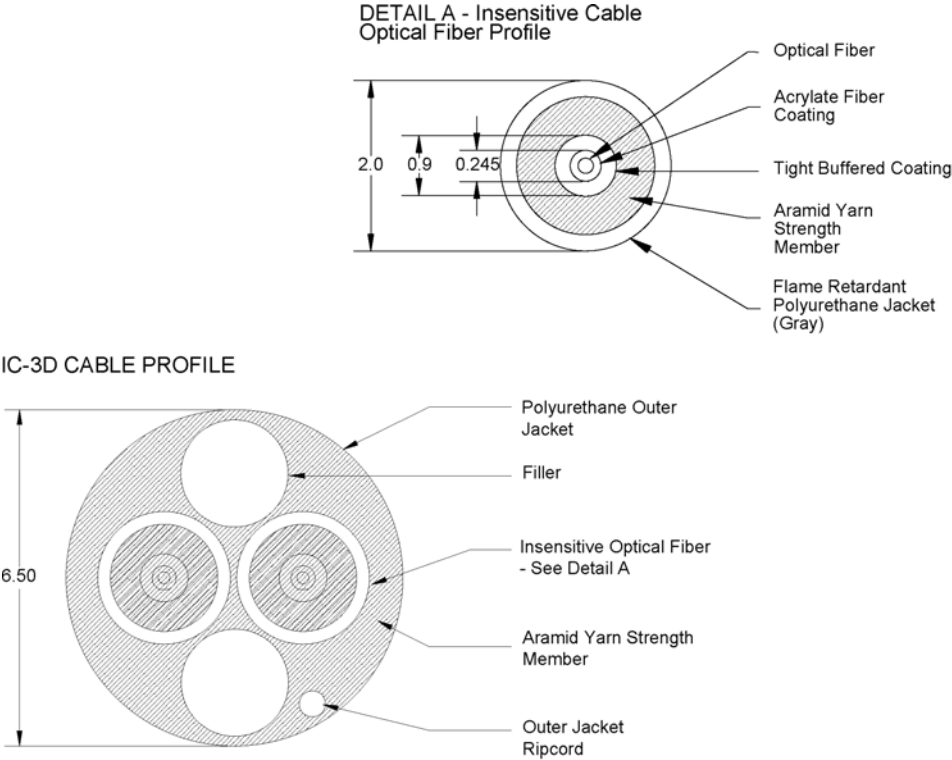**Figure 3 -** Deployment of the SecurLAN-R Cable



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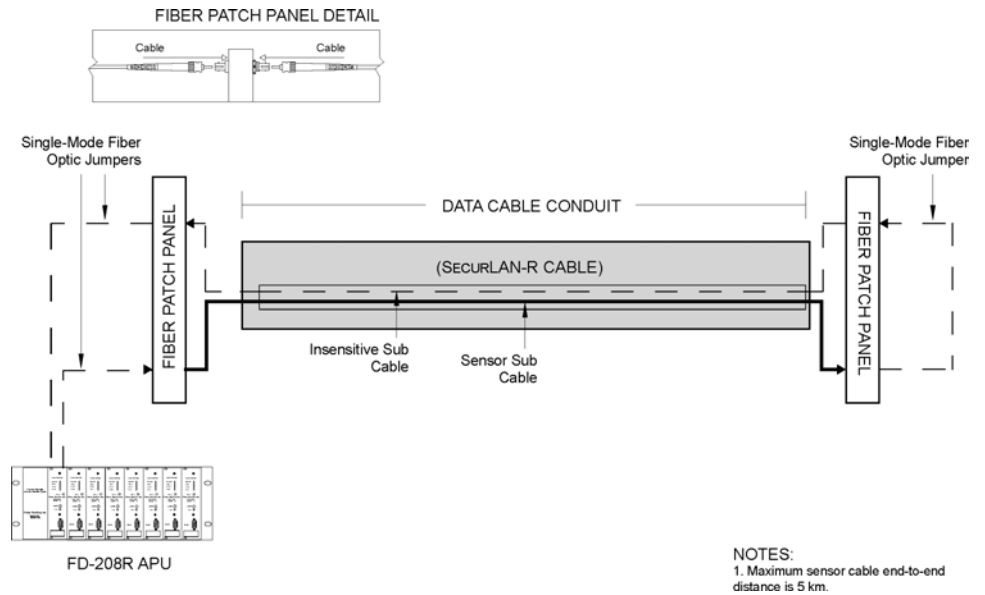
**SecurLAN-R range limitations**

Standard, 9µm/125µm single-mode optical fiber can be used to connect the sensor subcable to the insensitive lead-in cable. While the insensitive lead-in sub cable has a range of 20 km, the SecurLAN-R cable is limited by the 5 km range of the sensor cable.

## IC-3D INSENSITIVE DUPLEX CABLE

The IC-3D cable has 2 insensitive single-mode optical fibers bundled inside a common jacket (Figure 4).

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**Figure 4 -** IC-3D Duplex Cable Profile

DETAIL A - Insensitive Cable
Optical Fiber Profile

- Optical Fiber
- Acrylate Fiber Coating
- Tight Buffered Coating
- Aramid Yarn Strength Member
- Flame Retardant Polyurethane Jacket (Gray)

2.0   0.9   0.245

IC-3D CABLE PROFILE

- Polyurethane Outer Jacket
- Filler
- Insensitive Optical Fiber - See Detail A
- Aramid Yarn Strength Member
- Outer Jacket Ripcord

6.50
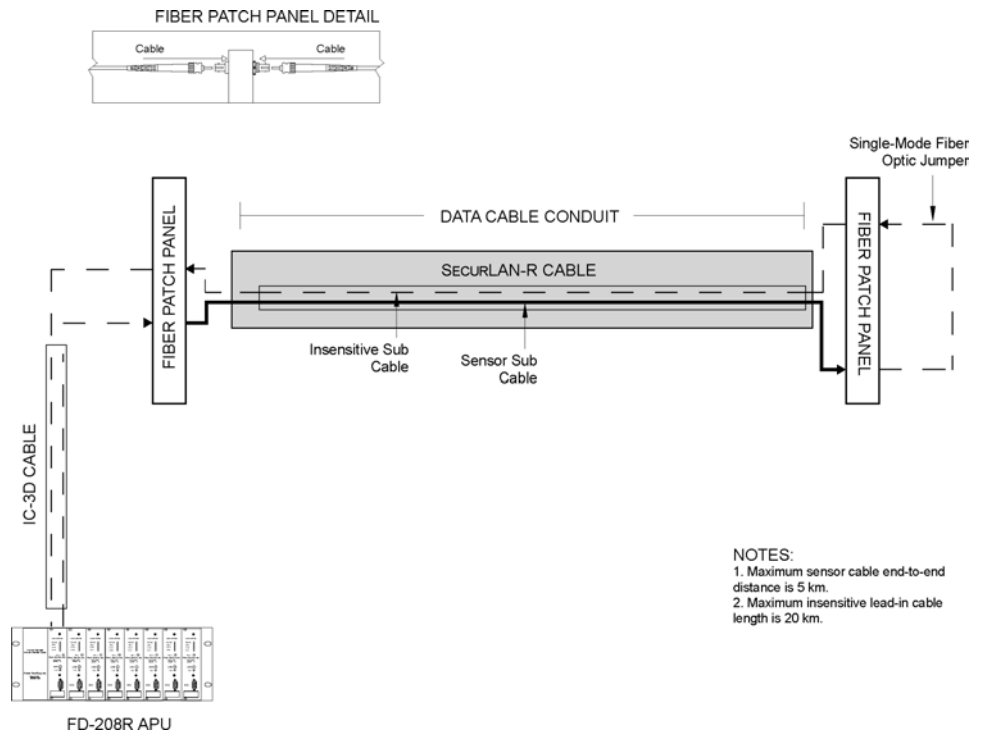
Notes:

1. All dimensions in mm unless otherwise noted

2. Drawing not to scale

While a properly deployed SecurLAN system requires the use of 2 insensitive leads per zone, the IC-3D cable allows this requirement to be met through the deployment of 1 bundled cable rather than 2 separate cables.   This can be best accomplished by combining use of the IC-3D cable with the SecurLAN-R cable as shown in Figure 5.

**IC-3D cable advantages**

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**Figure 5 -** Typical IC-3D Cable Application



Note that the cable deployment depicted in Figure 5 is similar to the SecurLAN-R cable application shown in Figure 3.  The notable difference is the use of IC-3D duplex cable in place of the single-mode fiber optic jumpers.  Using IC-3D this way extends the distance between the FD-208R and the fiber patch panel up to 20 km (the same effect can be achieved using two separate IC-3 cables).
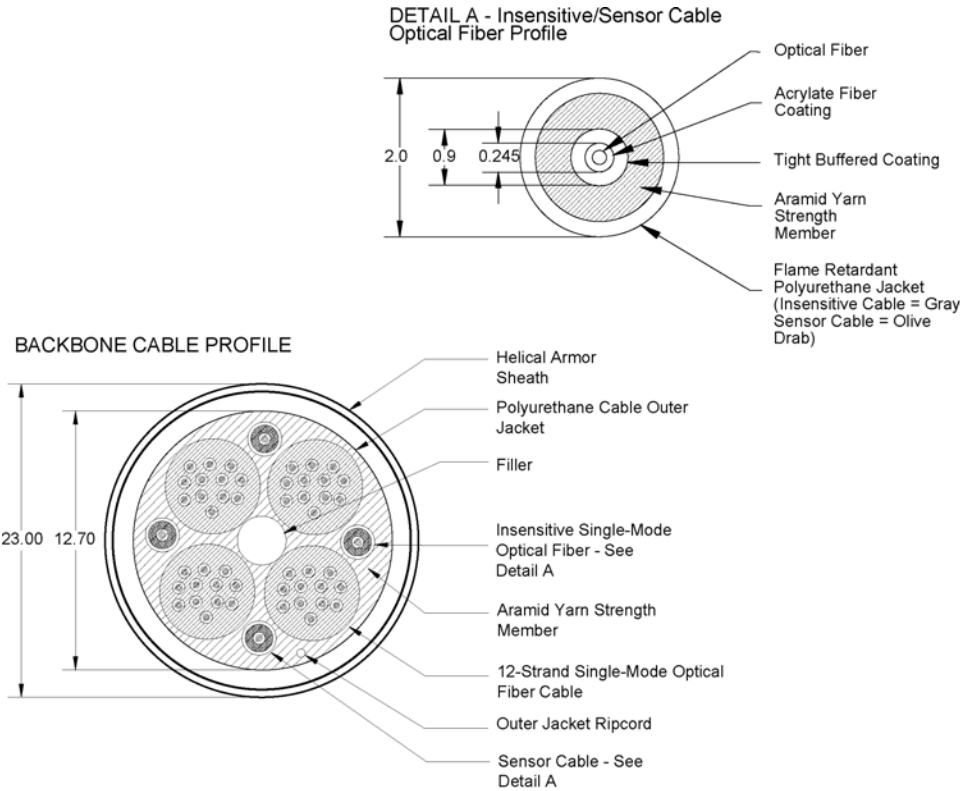
IC-3D comes in a plenum-rated jacket.

**IC-3D cable range limit**

## SECURLAN BACKBONE CABLE

A third bundled cable, the SecurLAN backbone cable, offers an alternative for integrators who have not yet installed the data cable needing protection.  This cable offers both sensor cable and insensitive lead-in cable, but also offers four 12-to-24 strand single-mode sub-cables for data transmission.  This cable assembly is secured inside a polyurethane-coated aluminum armor sheath (Figure 6)

**SecurLAN Backbone cable construction**

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**Figure 6 -** SecurLAN Backbone Cable Profile

DETAIL A - Insensitive/Sensor Cable
Optical Fiber Profile

- Optical Fiber
- Acrylate Fiber Coating
- Tight Buffered Coating
- Aramid Yarn Strength Member
- Flame Retardant Polyurethane Jacket (Insensitive Cable = Gray Sensor Cable = Olive Drab)

2.0    0.9    0.245

BACKBONE CABLE PROFILE

- Helical Armor Sheath
- Polyurethane Cable Outer Jacket
- Filler
- Insensitive Single-Mode Optical Fiber - See Detail A
- Aramid Yarn Strength Member
- 12-Strand Single-Mode Optical Fiber Cable
- Outer Jacket Ripcord
- Sensor Cable - See Detail A

23.00    12.70

Notes:

1. All dimensions in mm unless otherwise noted
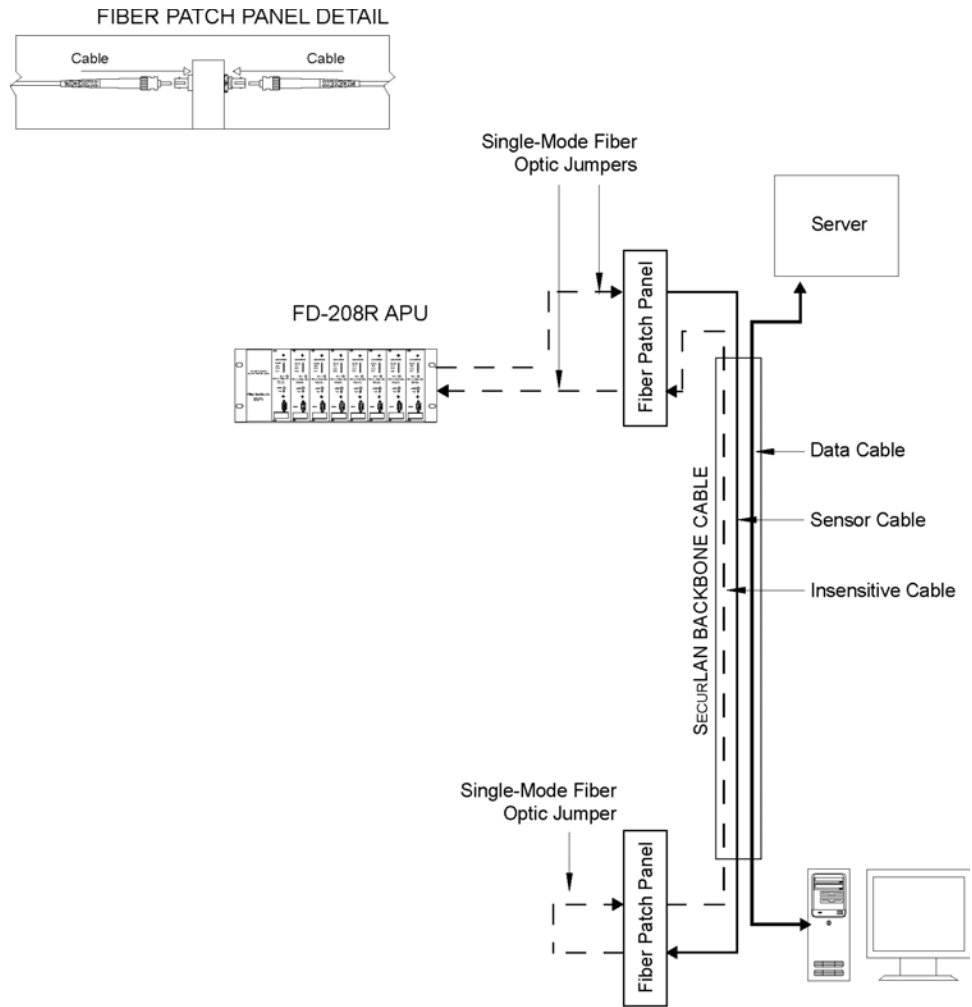2. Drawing not to scale

The SecurLAN Backbone cable is commonly used to provide secure data from one point to another in a network (Figure 7).  Unlike most conventional data cables, the SecurLAN Backbone cable's maximum allowable distance is limited by the 5 kilometer range of its sensor sub cable.

**SecurLAN Backbone cable range limitations**

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**Figure 7 -** Typical SecurLAN Backbone Cable Deployment



FIBER PATCH PANEL DETAIL

Single-Mode Fiber Optic Jumpers

Server

FD-208R APU

Fiber Patch Panel

Data Cable

Sensor Cable

Insensitive Cable

SecurLAN BACKBONE CABLE

Single-Mode Fiber Optic Jumper

Fiber Patch Panel

NOTES:
1. One sensor cable loop per zone.
2. Maximum sensor cable end-to-end distance is 5 km.
3. Maximum insensitive lead-in cable length is 20 km each leg.

**Alternate cable configurations**

Alternatively, IC-3 or IC-3D can be used in place of the single-mode fiber optic jumpers to extend the distance from the FD-208R APU to the backbone cable up to 20 kilometers.

The SecurLAN Backbone cable is an effective cable assembly for creating 2 protection zones with minimal cable deployment. Figure 8 shows the creation of 2 zones using 2 SecurLAN Backbone cables.

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**Figure 8 -** Zone Creation with the SecurLAN Backbone Cable
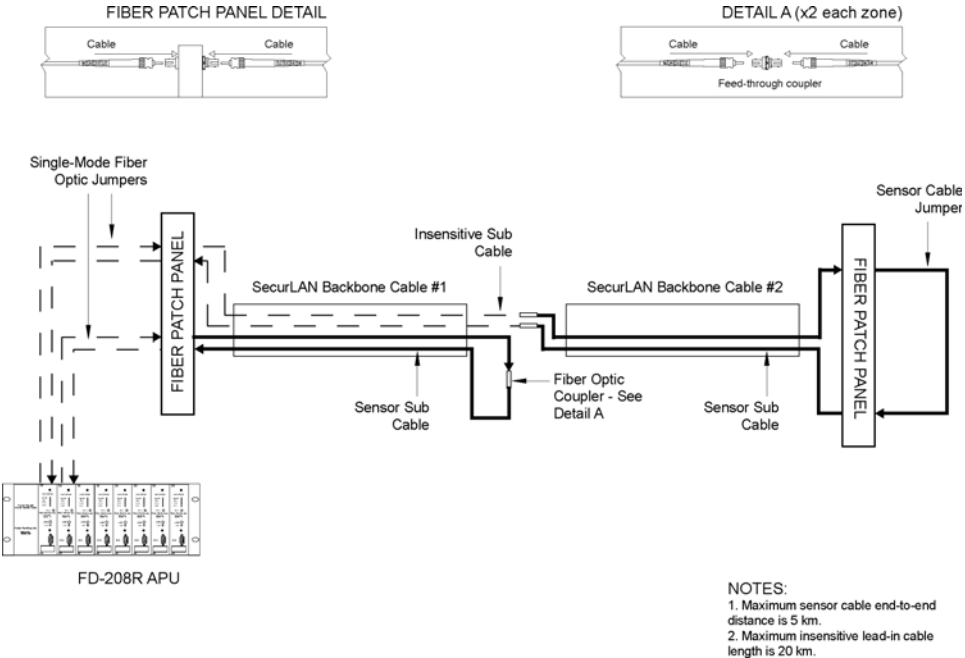


Conversely, using standard IC-3 and SC-3 cables would require at least 6 separate cable runs.

## INDOOR AND OUTDOOR APPLICATIONS

These SecurLAN bundled cables, while rated for plenum-type applications, may alternatively be used in either indoor or outdoor deployments.

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*For more information on using SecurLAN bundled cables, please contact Fiber SenSys' technical support team directly at +1-503-692-4430 or by email at info@fibersensys.com.*

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