
SUMMARY

The insensitive lead-in capability of the Fiber Defender Model FD-208/ FD-208R and FD-34x allows users to deploy these systems in Class I, Division II or Zone II flammable hazardous areas. Both Fiber Defender systems are suitable for protecting locations where containers of flammable materials are stored, provided that no electrical components (the APU, power leads, etc.) are routed through the area. This application note outlines the basic steps for deploying a system in a manner that ensures a flammable hazardous area is protected against intrusion while meeting the requirements for intrinsically safe apparatus.

INTRODUCTION

A *flammable hazardous area* is an area in which ignitable material is present (dust, gases, liquids or other material) during storage or normal operations, presenting the potential for fire or explosion. Such areas are classified according to the type and level of flammable material present. Flammable hazardous areas are classified by *29 CFR 1910, Subpart S, Electrical Safety in the Workplace* and by European Community CE standards.

Properly deployed, the Fiber Defender Model FD-208/FD-208R and FD-34x are capable of meeting the requirements for an intrinsically safe apparatus. An *intrinsically safe apparatus* is any apparatus with circuits from which “any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions” (UL 913).

CAUTION:

Only when deployed in compliance with the guidelines of this application note do the FD-208/FD-208R and FD-34x systems meet the requirements for an intrinsically safe apparatus for Class I, Division II (or Class I, Zone II) areas.

Application Note



Protection of Flammable Hazardous Areas

Application Note

FLAMMABLE AREA TYPE COMPATIBILITY

Flammable hazardous area rating

The Fiber Defender FD-208/FD-208R and FD-34x comply with intrinsically safe apparatus requirements for Class I, Division II (North America only) or Class I, Zone II locations. A Class I, Division II location is any area where flammable or volatile gases or liquids exist but are normally stored and prevented from release by mechanical means (such as a container). A Class I, Zone II location is similar in definition but flammable gases or vapors may consequently exist in normal operation for a short period of time and may be removed by positive ventilation.

Class I, Division II and Class I, Zone II areas are also locations that receive ignitable emissions from adjacent Class I, Division I (or Zone I) areas.

DEPLOYMENT GUIDELINES

This section outlines general guidelines for deploying the components of the Model FD-208/FD-208R and FD-34x systems to conform with the requirements for intrinsically safe apparatus in a Class I, Division II (or Class I, Zone II) flammable hazardous location.

LOCATING THE APU

Advantages of the FD-208/ FD-208R and FD-34x

The primary advantage of both the FD-208/FD-208R and FD-34x is the use of insensitive lead-in cable to connect the electronic Alarm Processing Unit (APU) to the fiber optic sensor cable. These systems support insensitive lead-in cables measuring up to 20 km long on each leg.

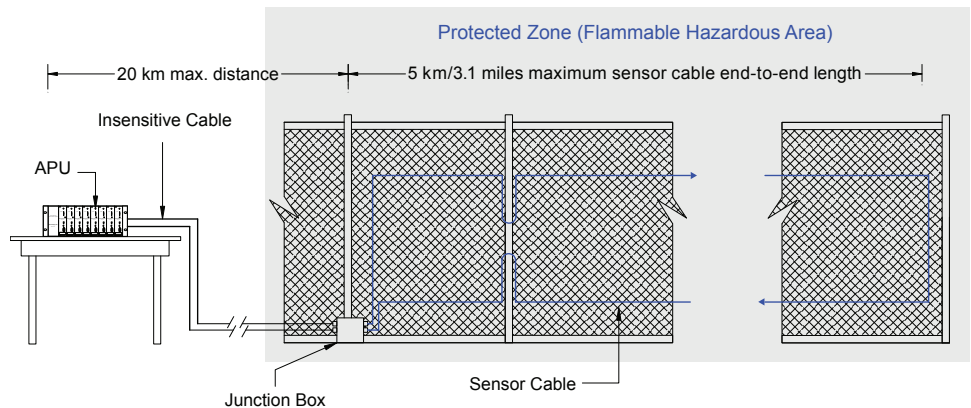


Figure 1 - Remote deployment with the FD-208/FD-208R and FD-34x Systems

CAUTION:

All electrical portions of the Model FD-208/FD-208R and FD-34x systems, including power leads, power cords, communication leads and wires or cables connecting the alarm relay output to the alarm panel must be kept out of the protected area if the protected area is located in a flammable hazardous location. The electrical portions of these systems are not inherently safe.

When mounting the APU, choose an area that is free from the effects of vibration. Fiber SenSys recommends mounting the APU in a waterproof, weatherproof NEMA enclosure. Avoid mounting the APU in direct sunlight whenever possible. Ensure the location of the APU does not require power leads or alarm relay contact leads to route through a flammable hazardous area.

Locating the APU/power leads

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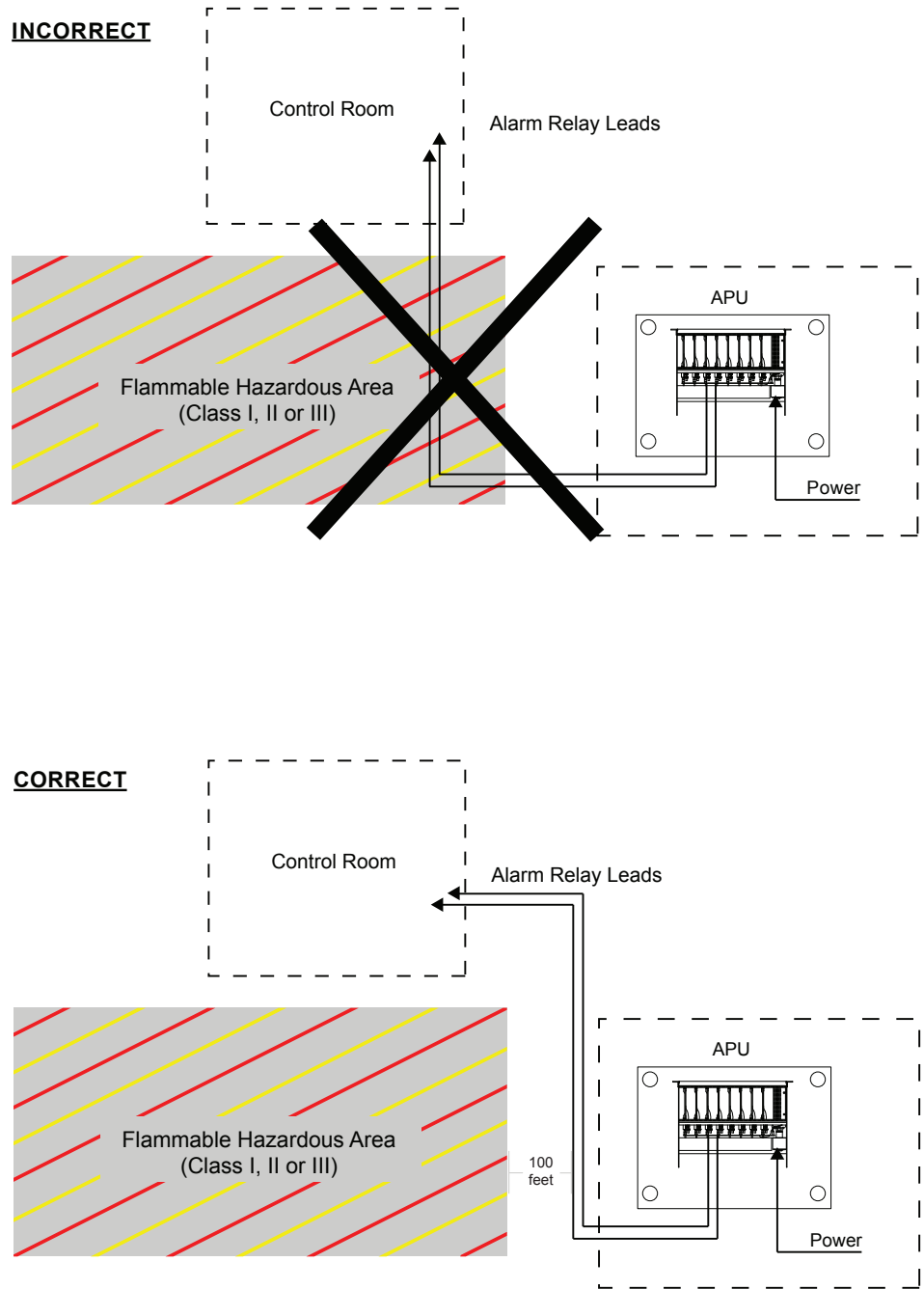


Figure 2 - Routing APU power and communication leads

DEPLOYING THE FIBER OPTIC CABLE

The FD-208/FD-208R and FD-34x systems are capable of meeting the intrinsically safe apparatus requirements because of their use of fiber optic cable. Both the sensor cable and insensitive lead-in cables are entirely made of inert optical fiber. By nature, optical fiber conducts lights, not electrical signals. When the light-conducting, fiber optic sensor cable is deployed in the protected area, vibrations from intrusion attempts disturb the pattern of conducted light, creating an alarm condition in the APU. Because it is not conducting electrical signals however, the fiber optic cable poses no danger to a surrounding Class I environment.

The fiber optic sensor cable is deployed in a manner that protects the perimeter throughout the Class I area. If the perimeter consists of a chain link fence, for example, the sensor cable is attached to the fence fabric. Attempts to climb over or cut through the fabric physically disturb the sensor cable, creating an alarm condition. Details on protecting various types of perimeter barriers are discussed at length in Chapters 3 and 4 of the corresponding product manual.

Prior to deploying the sensor cable on the barrier, the cable is inserted into flexible, protective conduit. In some instances, the inner diameter of the protective conduit is large enough to permit users to also deploy power or communication leads. However, for deployment in flammable hazardous areas, only the sensor cable is allowed to be placed inside the conduit. Power and communication leads - including current - carrying leads from other systems, must not be inserted into the conduit along with the sensor cable.

Principles of operation

Routing cable through protective conduit

Application Note

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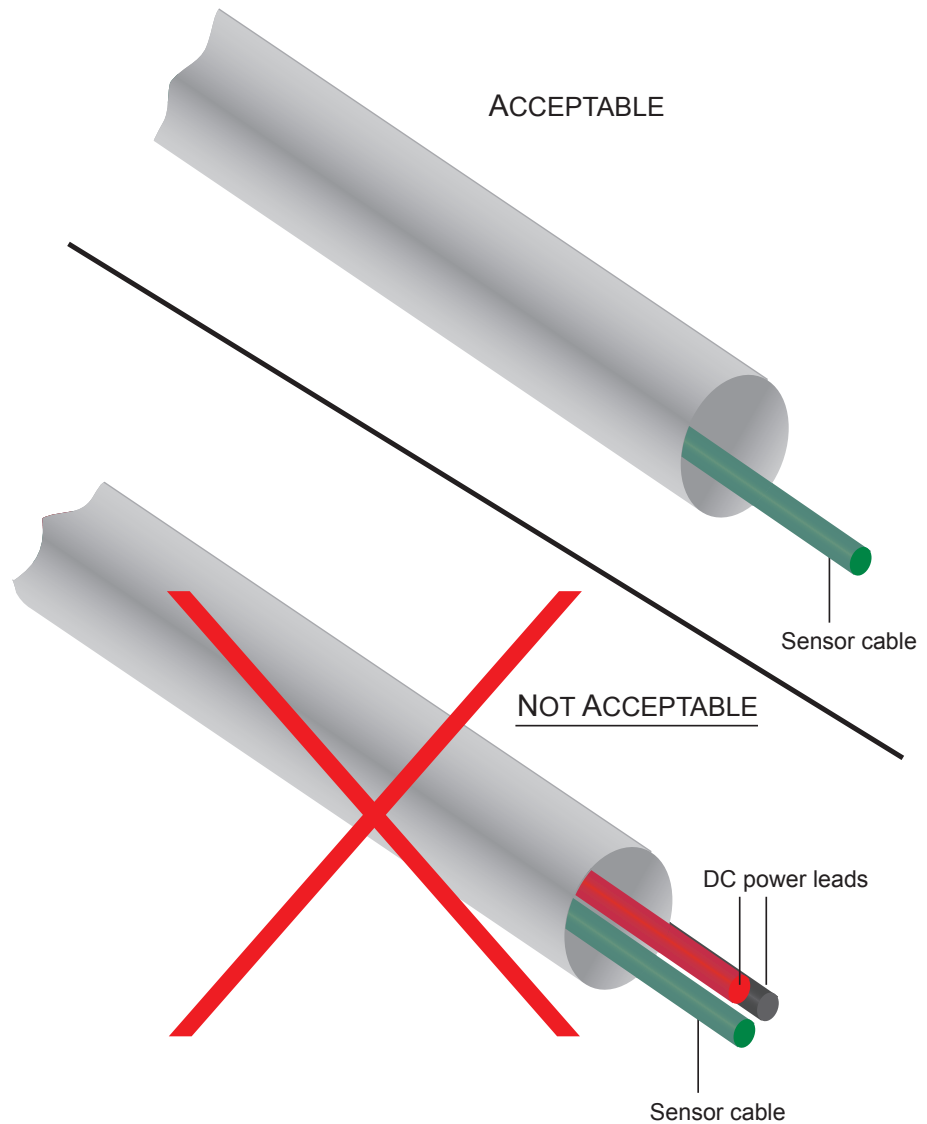


Figure 3 - Proper use of protective conduit in flammable hazardous areas

Attaching sensor cable to barriers

Only the 16 or 18 gauge stainless steel wire ties provided by the factory must be used to attach the sensor cable/conduit assembly to the perimeter barrier. Contact Fiber SenSys prior to using any other means of attachment.

INSENSITIVE LEAD-IN CABLES

Following deployment of the sensor cable, the fiber optic insensitive lead-in cables must be run to connect the sensor cable to the remote APU.

Two insensitive lead-in cables must be used to connect the sensor cable to the FD-208/FD-208R and FD-34x APU. One lead-in cable connects the sensor cable to the output of the APU; the other lead-in cable connects the sensor cable to the APU input. This configuration forms a closed optical loop, thereby allowing the APU to transmit a coherent pattern of light into the vibration-sensitive fiber optic cable and analyze its return pattern (see Figure 1).

Insensitive cables - purpose

NOTE:

Insensitive leads can be used to connect the sensor cable to the input and output ports of the APU only. Inensitive fiber optic cable cannot be inserted into the middle of the sensor cable run.

Because the insensitive lead-in cables are insensitive to vibration, they do not need to be deployed in the protected area in parallel with the sensor cable nor do they need to be enclosed in flexible protective conduit. However, the use of protective conduit is strongly recommended if the insensitive lead-in cables are deployed above ground.

Deploying insensitive leads

CONNECTING THE LEAD-IN CABLES TO THE SENSOR CABLE

Both the lead-in cables and sensor cable must be terminated with industry-standard ST-type optical connectors. Epoxy or crimp-on type connectors are both acceptable. Once terminated, the cables are joined together using a feed-through coupler (sometimes referred to as a “mating sleeve”). Such feed-through couplers may be rated for either single-mode or multimode optical fibers; however, use of single-mode feed-through couplers is recommended.

Protecting connection points

Wherever the insensitive lead-in cables connect to the sensor cable, the feed-through couplers and ST connectors of the cable ends must be protected by enclosing the connection point in an encapsulation kit. Fiber SenSys offers a re-sealable encapsulation kit (part number ENKT-661) for this purpose.

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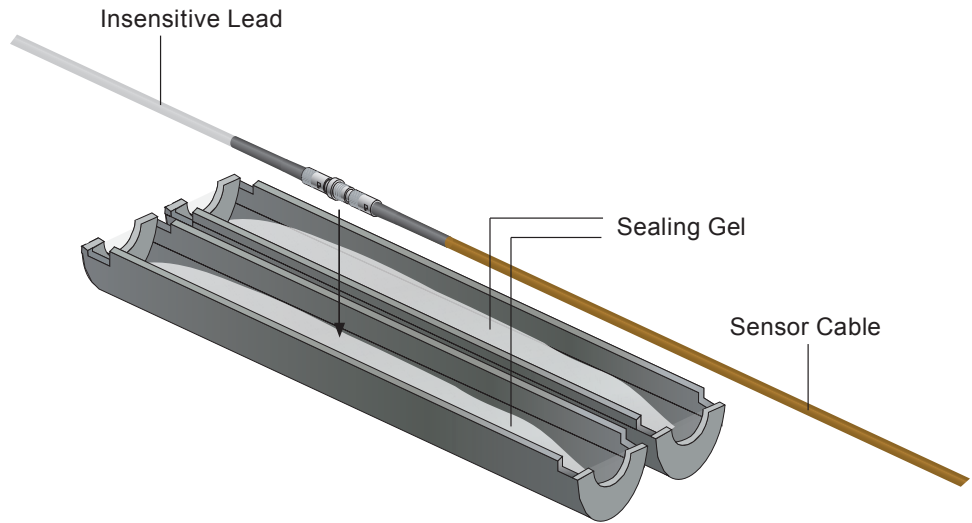


Figure 4 - Protecting the connection point with an encapsulation kit

In addition to enclosing the connection point in an encapsulation kit, users should house the encapsulated assembly in a protective enclosure or junction box. Any enclosure or junction box must be approved specifically for use in Class I, Division II or Class I, Zone II areas.

CAUTION:
The enclosure must be used for housing the encapsulated assemblies only. Do not enclose any current - carrying lead, cable or apparatus in the enclosure.

COMPLETING THE INSTALLATION

Upon completion of the FD-208/FD-208R or FD-34x system installation, all portions of the protected perimeter residing within a flammable hazardous area are protected by fiber optic sensor cable only. All electrically - conductive system components must be outside the area (Figure 5).

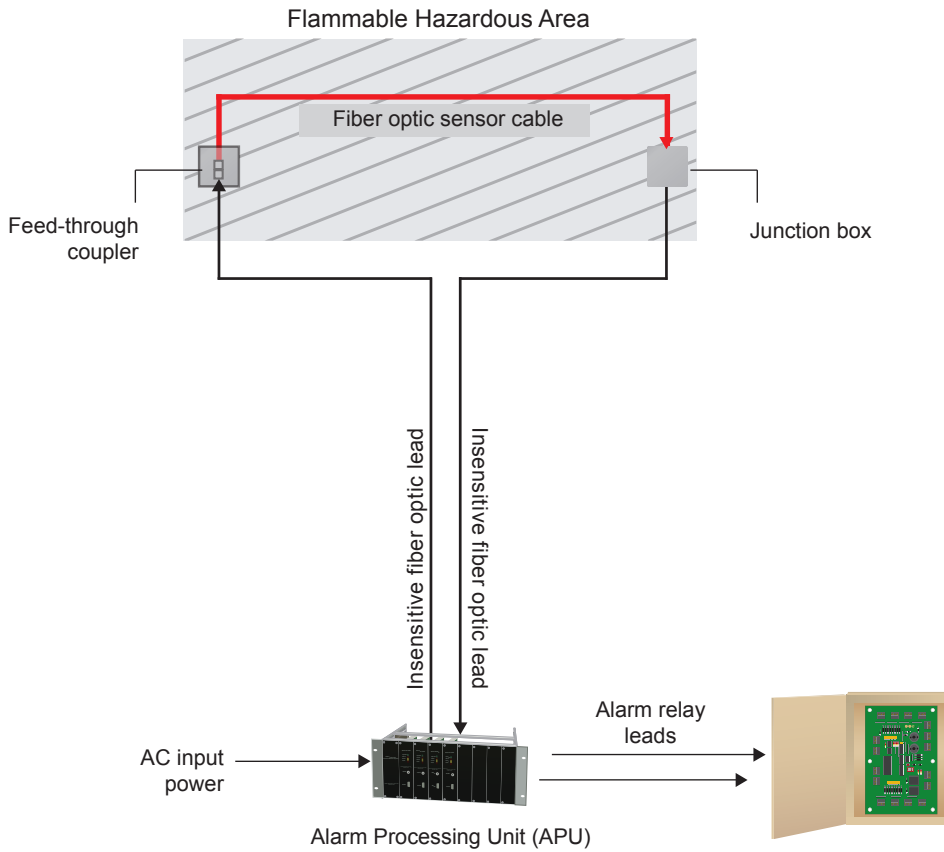


Figure 5 - Layout of the completed installation

For more information on deploying the Fiber Defender Model FD-208, FD-208R or FD-34x series systems to protect a perimeter within a flammable hazardous area, please contact Fiber SenSys' technical support team at +1.503.692.4430 or by E-mail at info@fibersensys.com.



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