Vikonics, Inc.
370 North St. Teterboro, NJ 07608

Security System For Conduits

Specification 11020-C

7 World Trade Center, 23rd Floor
Office of Emergency Management

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2.0 Requirements

2.1 General Requirements

The contractor will supply all materials and labor required to complete the described. All work is to be performed in accordance with applicable building codes. Materials specified herein (by Manufacturer and Model number) are the only approved materials. All wire used will be UL and NYC approved and as specified. All installation is to be performed to Manufacturer's instructions. The contractor shall maintain a set of redline drawings showing any approved deviations from the original contract drawings. The drawings are to be submitted to Vikonics fifteen (15) days after completion of the work.

2.2 Contractor Requirements

The requirements are detailed in the following paragraphs. The contractor must provide evidence of compliance to the requirements. At a minimum, the Contractor is required to check continuity of all cables installed by the Contractor. All work that is to be concealed must be inspected, tested, and approved before concealment. All required tests are to be conducted by the contractor and the results provided with notification that the task is ready for verification. The contractor shall provide a minimum of 24 hours notice of inspections to be performed. All cables must be identified with permanent markers per the numbers in the wiring tables. Markers are to be applied 6" from the cable ends and be visible in the terminating enclosure. Service loops (12" minimum in excess of termination lengths) are to be provided at both ends of cables. **Note that fiberoptic cable requires special handling and bend radii.**

The sensor cable is to be installed in every conduit except Power between the 23rd floor and both the 7th floor and the roof radio room. The sensor cable is to be connected as one loop for each set going from the 23rd floor. If an odd number of conduits are to be protected then on conduit will contain two sensor cables. See Figure 2.2

2.3 Fiber-Optic Conduit Security System Specifications and Installation Guideline

The following paragraphs provide a description of the components that comprise fiber optics of the security system.

The "Fiber Defender 205", manufactured by Fiber SenSys, Inc. (FSI), is part of a new generation of fiber-optic intrusion detection systems. They build on the fiber-optic intrusion detection technology developed by FSI and proven in the field over several years. Advanced signal processing benefits the customer with simplified setup and maintenance and the lowest potential nuisance alarm rate of any system.

1.0 Statement of Work

1.1 General Description

The successful bidder is required to supply and install specialized security equipment and fiber-optic cable in conduits between the 7th and 23rd floor and the 23rd floor and roof radio room. This will involve adding fiberoptic sensor cable in each conduit carrying cables utilized by OEM. The number of conduits and length of the Fiberoptic Sensor Cable is to be determined by the bidder. The specified electronic sensor equipment will be supplied and installed in Room 23-50. The sensor unit alarm output is to be connected to the alarm monitoring panel in Room 23-50. All efforts are to be coordinated with other disciplines the Architect, and Vikonics. The Material prices includes the cost of Vikonics to inspect and approve the bidder's efforts, system setup and calibration, and database generation.

1.2 Location

The site is located at Seven World Trade Center and covers the conduit between the 23rd floor, part of the 7th floor, and a radio room on the roof.

1.3 Applicable Specifications

DIAM 50-3	Defense Intelligence Agency Manual
DCID 1/21	Director of Intelligence Directive
	National Electrical Code
	NYC Building Code

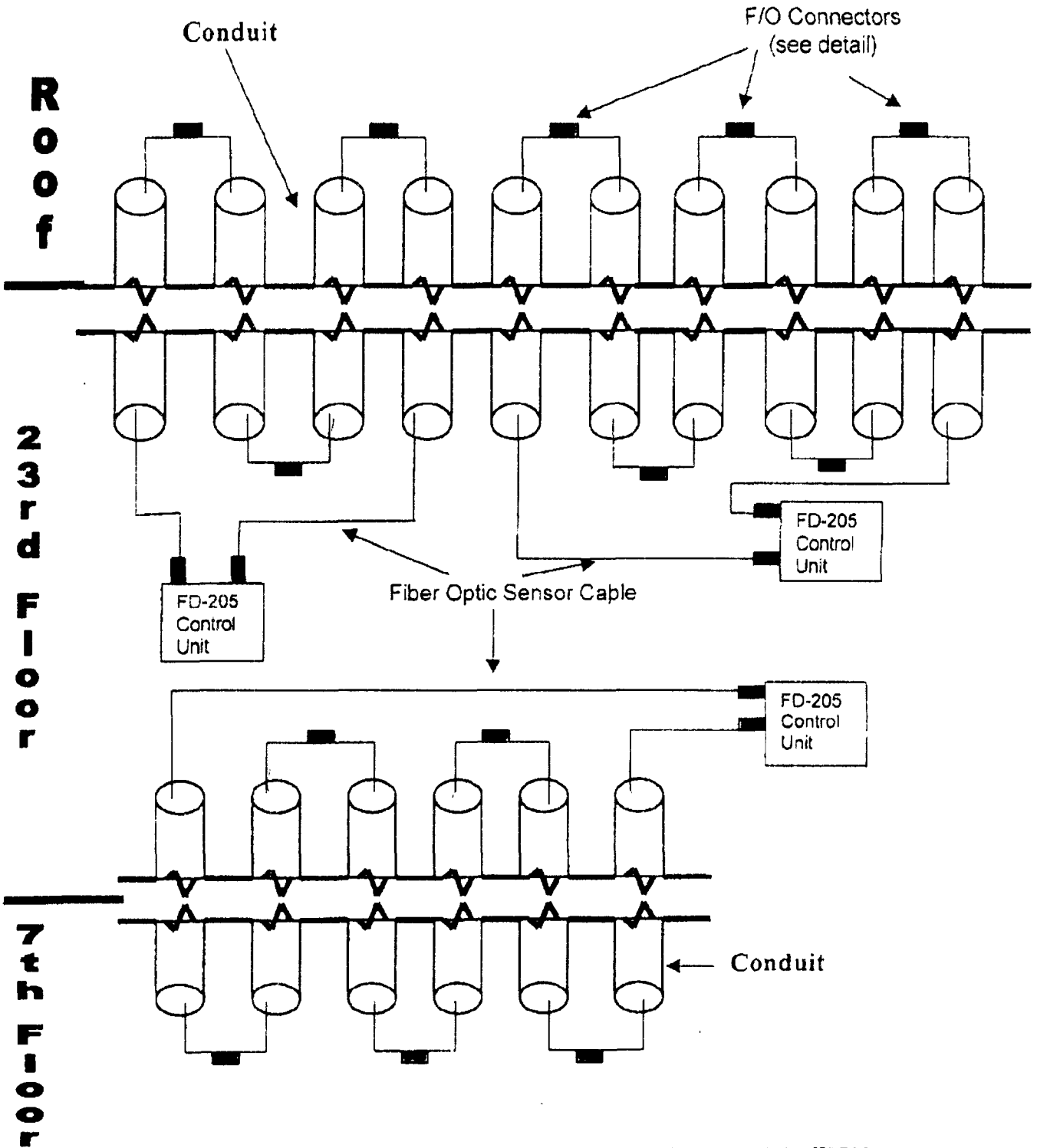
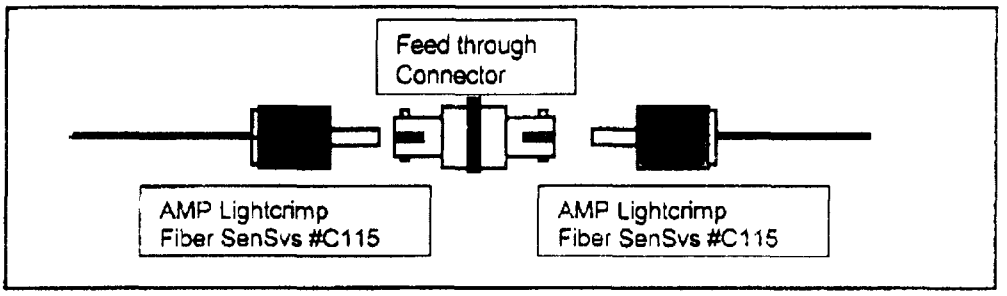


FIGURE 2-2. FIBER-OPTIC SENSOR CABLES INSTALLATION

MA TIFICATION



The Fiber Defender 205 is an alarm processor module for intrusion detection systems based on an optical fiber sensing cable that is installed in conduits. Advanced digital signal processing makes the FD-205 "smarter" than other units. In simple terms, this means that the system can do a better job of analyzing disturbances and differentiating between a real intrusion and common sources of nuisance alarms such as heavy vehicles passing nearby.

Fiber-optic intrusion detection has some important benefits over other technologies. One is immunity to electrical interference, particularly important for installations near high volume electrical equipment. Another key benefit is the ability to protect areas of long length FSI fiber-optic systems can be configured with single "zones" up to 6,500 feet in length and

The fiber-optic cable used has a single fiber at the center with protective jacketing around it. Connections are made with standard "ST crimp-on" connectors. (Part # C-115) Assembly instructions and a tool kit for these connectors are available from Fiber SenSys. (Part # CK-200) If the cable is cut or damaged after installation, a replacement section can be installed with connectors and a "feed-through coupler." (Part # C-FT)

offer superior value in intrusion sensors.

The Fiber Defender 205 is designed to be a low cost perimeter component in a larger, integrated security system. Normally open and normally closed contact closures are provided for connection to Vikonics' alarm panels.

2.3.1 Fiber Defender 205 Operation

When an optical fiber is disturbed, it changes the way that it conducts light. The change is very small; but with the right light source and detection method, this change can be amplified to create a useful signal similar to the voltage generated by a microphone in contact with something that is moving or vibrating.

A laser injects coherent light into the fiber. This light transverses the fiber to a detector where it is converted to an electrical signal. The signal is processed to decide whether there is a disturbance of the right quality to generate an alarm. The signal processing depends on parameters that are set by the user to control what kind of signal should create an alarm and what should not. The system uses standard connectors and protective cable structure in telecommunication systems.

To avoid nuisance alarms, the low-frequency cutoff is set to around 200 Hz. The high-frequency cutoff is typically set to 450 Hz so that the processor only sees signals related to the trespass.

2.3.2 Fiber Defender 205 Specifications

MAXIMUM ZONE SIZE	Perimeters up to 6,500 feet
SENSITIVITY	Uniform over entire length
INPUT VOLTAGE REQUIREMENT	10-24 Vdc
POWER DRAW	2.1 watts at 12 Vdc at 25°C
OPERATING TEMPERATURE RANGE	-30 to 55°C (Expanded temperature range is available.)
OUTPUTS	
ALARM	1 amp N.C./N.O. relay contact
COMMUNICATION	RS-232C
INPUT	
TAMPER	1 amp. N.O. relay contact
ALARM OUTPUT DURATION	Programmable
SIZE	6" x 10" x 1"
FIBER-OPTIC SENSING CABLE	FSI Part #SC3
CABLE LIFE EXPECTANCY	20 years
CONNECTORS	ST type, crimp-on

Fiber SenSys, Inc.
A Corning Affiliate

Sensing and Data Fiber Features and Specifications
SC-3 and SC-4 Fiber-optic Cable

FEATURES

- Small, lightweight, flexible
- Strong, rugged, survivable
- Designed for use in adverse environments
- Round cable design for easy installation and survivability
- Polyurethane jacketed for abrasion, cut and chemical resistance and wide temperature range
- Exceptional operation temperature range of -55 C to +85 C

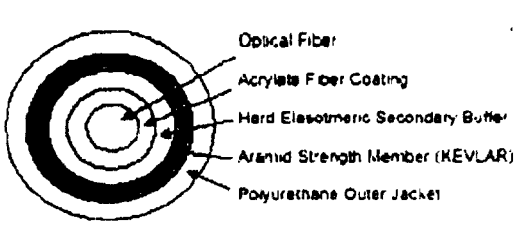
SPECIFICATIONS

Part Number	Diameter mm (in)	Weight Kg/Km (lbs/1000')	Breaking Strength N (LBS)	Specific Gravity
SC-3	3.0 (.12)	8.4 (6)	1,700 (380)	1.15
SC-4	4.0 (.16)	15 (10)	1,700 (380)	1.15

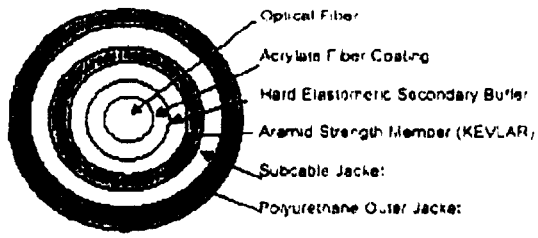
Minimum Bend Radius	
Under Installation Tensile Load	20X outside diameter
Under long-term Tensile Load	10X outside diameter
Operating Temperature	-55°C to +85°C
Storage Temperature	-70°C to +85°C
Crush Resistance (DOD-STD-1678, Method 2040)	440N/cm
Impact Resistance (DOD-STD-1678, Method 2030)	200 Impacts
Flex Resistance (DOD-STD-1678, Method 2010)	2,000 cycles

These specifications are subject to change without prior notification

CABLE CROSS-SECTION DIAGRAMS



SC-3
(Recommended for above ground applications)



SC-4
(Recommended for buried applications)

3.0 Electronic Security Tasks

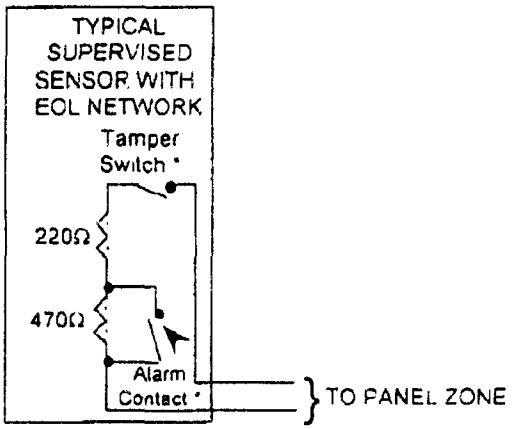
3.1 Electronic Security Wiring Requirements

All wiring is to conform to applicable building codes. All wires are to be permanently marked with the wire numbers shown on the wire lists.

3.3 Sensor Mounting and Wiring Requirements

End of line resistors are to be installed on each sensor processor. The EOL resistor network is to be wired as shown in Figure 3-1.

FIGURE 3-1. END OF LINE RESISTOR WIRING



Continuity is to be tested on all wiring. Vikonics will program the sensor processors.

TABLE 3-2. ALARM WIRING REQUIREMENTS

FROM	LOCATION	Wire Req.	wire #	To Panel	Panel Location
FD-205 #1	ROOF CONDUIT	2 PR 18 AWG SHIELDED	351	AMP 10-5	RM 23-50
FD-205 #2	7th FLOOR CONDUIT	2 PR 18 AWG SHIELDED	352	AMP 10-6	RM 23-50

2.4 Specific Materials to be supplied

The following list of Fiber-Optic equipment is to be purchased from Vikonics, Inc. and installed per the Manufacturer's instructions. This list does not include wire, installation materials, connectors or tools, etc., which are to be supplied by the Contractor.

TABLE 2-1. FIBER-OPTIC BILL OF MATERIALS

Model	Description	Qty	Manufacturer
FD-205	Alarm Processing Unit	3	Fiber SenSys
SC-3	3mm Cable	1850	Fiber SenSys
C115	Connector 10 / PKG	4	Fiber SenSys
C-FT	Coupler	13	Fiber SenSys
CK-200	Tool Kit	1	Fiber SenSys
MC-100	Hand Held Calibrator	1	Fiber SenSys

The items listed in Table 2-1 will be purchased from:

Vikonics, Inc.
370 North Street
Teterboro, NJ 07608

Phone: 201-641-8077
Fax: 201-641-7728

The cost for these materials is $33,290.00. This price includes Vikonics' calibration labor and installation support.